THE

UNITED SERVICE.

EDITED BY L. R. HAMERSLY.

NOVEMBER 1894.

THE MAGAZINE RIFLE: ITS DEVELOPMENT AND USE.

THERE is one branch of the science of art that is hardly equal to the demands put upon it, notwithstanding the new inventions that are being announced almost every day; and that branch is the manufacture of magazine rifles for military and naval use. Nations have been long demanding a better small-arms armament for their armies and navies, and busy brains have been trying to satisfactorily meet this demand; but there is not a nation to-day that is thoroughly satisfied with the magazine rifles in the hands of its troops; yet each nation has provided itself with what it considers the best military rifle on the market.

The weapons now issued to armies are of a more and more dangerous character, and they tend to make war even more terrible in the future than it has been in the past. The invention of formidable weapons of war continues to receive so much encouragement that only the most fearful carnage may be expected in the next great struggle as the result of the various efforts to increase the efficiency of fire-arms. Other new inventions of war with similar purposes of wholesale destruction are being manufactured, and the old black powder which served man so long and faithfully appears like a dwarf beside its newborn brother; and the Minie-ball has drawn itself out and donned a jacket of steel.

Yet as we cannot tell what new inventions remain unlocked in the closets of science, it will be well to look back and take a cursory glance at the advancement made in the manufacture of small-arms, in order

to form a more perfect idea of the inventive qualities of the American mind which first made the magazine rifle possible.

In 1577, the wheel-lock, which ignited the powder by the sparks produced by rapidly revolving a wheel on the side of the lock, took the place of the old match; and in 1630, the flint-lock did away with the wheel, only to be superseded in 1822 by Shaw's percussion cap. But this cap in turn proved to be only a stepping-stone in the progress of inventions, for in 1856, George W. Morse turned the percussion cap into a primer, and in 1857 he submitted for trial, by the military authorities of the United States, the first metallic cartridge with a primed and flanged head, and by this combination he made the magazine rifle a practical weapon. What has been said of the progress of the cartridge is also true of the rifle, which first began to supersede the old smooth-bore musket in 1804, during which year seven hundred and seventy-two rifles were manufactured at the United States Armory at Harper's Ferry, and in 1805 and 1806 three thousand and ninety-seven rifles were produced. There is no doubt but that these rifles were used in the war of 1812, for in a report of the number of arms collected at Greenleaf's Point this item is found: "Collected from individuals in this district and adjoining counties, from the close of the war to the close of the year 1817, four thousand four hundred and eighty-five muskets and one hundred and forty-five rifles." This and other information convinces me that full credit cannot be given to the statement frequently advanced that the first battle after the introduction of rifles was the Alma (1854).

On the 21st of May, 1811, Mr. John H. Hall obtained a patent from the United States for a breech-loading rifle, and, although there are evidences in history of breech-loading guns prior to this date, credit must be given to the United States as the birthplace of the first successful breech-loading rifle. In 1813, Mr. Hall presented a description of his invention to General Armstrong, then Secretary of War, who directed a few of them to be purchased for trial. Samples of this rifle were also presented in 1816; and in January, 1817, one hundred of Hall's patent rifles were purchased, and a company of riflemen was armed with them as an experiment. This proved so satisfactory that an agreement was made with Hall by the United States for the privilege of manufacturing ten thousand of his rifles, and he was employed at Harper's Ferry Armory to direct the work; and in December, 1826, "the staff of the school at Fortress Monroe expressed its perfect conviction of the superiority of this arm over every other kind of small-arm now in use, and this opinion has been formed after having seen two companies armed with them for five months."

The chief advantages of this rifle over the common ones in use at that time was the celerity and ease with which it could be loaded in all situations, and the interchangeability of the parts.

Under a resolution of the Senate of January 27, 1837, a board of officers was appointed to examine and report upon the improvements made in fire-arms by Hall, Colt, Cochran, and Baron Hackett; and they reported that "the standard arms now [then] in use in the service of the United States, regular and militia,—viz., United States musket and rifle, and Hall's musket, rifle, and carbine, with such improvements in construction as the latter are susceptible of,—combine in a higher degree all the requisites of convenience, durability, simplicity, and effect than any that have been suggested for a general armament."

In 1838, the Jenks breech-loading gun was submitted to a board of officers, composed of General Fenwick, Lieutenant-Colonel Talcott, Majors Baker and Erving, and Captain Mordecai. This board reported that "in common with other arms loading at the breech the machinery necessary to its operations is objectionable, and the arm, though ingenious in its design, is unsuited to the service of troops." But in 1841, a few of Jenks's carbines were sent to Carlisle Barracks for trial by the dragoons, and some were sent to Florida for trial in active service.

In April, 1842, another board of officers, composed of Major Payne, and Captains Lowd and Thornton, met at Fort Adams to test Jenks's patent carbines of one-half ounce calibre with percussion locks. This board, after firing four of the carbines to test their strength, and for accuracy and rapidity of fire, continued to fire one of them fourteen thousand eight hundred and thirteen times, when the nipple split, and they reported as their opinion that it was well adapted to and capable of performing all the requirements of the service. On the 14th of January, 1845, Lieutenant-Colonel Talcott reported that "there are now Colt's, Jenks's, Hubbell's, Nutting's, Cochran's, Chambers's, Ellis's, Hackett's, Smith's, and I know not how many other kinds of patented arms, the inventors of which can produce equal testimonials of the inestimable value of their arms and their decided superiority over everything else that has been offered to the government."

On the 29th of January, 1845, a combined board, composed of Generals Brooke and Gibson and Captain Mordecai of the army, and Charles Stewart and L. M. Powell of the navy, met at Washington Arsenal, to examine a percussion lock for small-arms invented by Dr. Edward Maynard; and to this board was also referred the Jenks carbine, which was recommended for boat service and in the "top" of vessels, as well as for the cavalry.

The Colt rifle, which was referred to the board of 1837, seems to have been the first repeater ever invented in this country, and, notwithstanding the recommendation of the board, several hundred of the Colt carbines and rifles were used in the Florida War. The principal objection to this class of small-arm seems to have been the lia-

bility of the accidental discharge of two or more chambers at the same time. About this time, 1845, the breech-loading needle-gun, invented by Jean Nicholas Dreyse in 1841, was introduced into the Prussian service, but, like all other breech-loaders of that date, it used a paper cartridge. This gun has been termed the original modern military rifle, but it did not come into existence until after the lapse of thirty years from the date of Hall's patent; and, as has been shown, not until quite a variety of American breech-loaders had been put upon the market, and at least one repeater. The next American gun of note was the Sharp's breech-loading rifle, invented in 1848. This rifle found such favor among military men that it was christened the "Old Reliable."

By the Act of August 5, 1854, the sum of ninety thousand dollars was appropriated "for the purchase of the best breech-loading rifles, in the opinion of the Secretary of War, for the United States army," and from that time to January 28, 1857, a few of the following-named rifles were purchased for trial,—viz., Sharp's, Perry's, Green's, Gibb's, Merrill's, Burnside's, Symmes's, Howe's, and Maynard's. These experiments continued, and in 1857 a board of officers was convened at West Point to examine and report upon certain breech-loading arms. This board was unfavorable to the adoption of breech-loaders until more perfected, but gave a preference to the Burnside arm.

From this time on, Americans seemed to concentrate their minds upon the improvement of fire-arms, and the next important demonstration of their inventive genius was the Spencer carbine, patented March 6, 1860. This was the first successful magazine rifle using a metallic cartridge, and during the Rebellion it proved a potent factor in the triumph of the Union forces on more than one occasion; but the Spencer carbine was objected to by the chief of ordnance, because it required a special kind of ammunition which contained fulminate of mercury as a priming composition in the head of the cartridge. The Spencer, the Ball, and the Winchester seem to have been the only magazine guns used during the Rebellion, but the government purchased some nineteen varieties of breech-loaders.

In 1865, Henry O. Peabody presented a breech-loading rifle to a board of officers assembled at Springfield, Massachusetts, and, after testing sixty-four other varieties, the board reported that "having examined and tested all of the breech-loading arms submitted for their consideration, the board recommends the breech-loading arm known as Peabody's." Another board, of which General Hancock was president, met at Washington on the 10th of March, 1868, to report upon breech-loading arms, and also the best method of converting the Springfield muzzle-loader into a breech-loader. After testing twenty-two varieties of breech-loading rifles and seventeen varieties of carbines, the board recommended that the muzzle-loaders be converted into the .45-calibre

Springfield breech-loader, after the model invented in 1865 by E. S. Allin, master armorer of the Springfield Arsenal.

During 1869 the Schofield board met at St. Louis to select the six best systems of breech-loading arms, and on the 10th of June, 1870, having examined thirty-four different kinds of breech-loading rifles, the board reported in favor of the Remington, Springfield, and Sharp's, in the order named. This decision was disapproved by the chief of ordnance, and on the 16th of July, 1870, his action was confirmed by the Secretary of War; and, under the provisions of an act of Congress passed in 1872, another board was ordered, of which General Terry was president. After the trial and examination of ninety-nine American and nine foreign inventions, the board recommended the adoption of the Springfield breech-loading system; and the Springfield rifle is still in the hands of our troops. But as certainly as the percussion cap superseded the flint-lock, and the rifle took the place of the smooth-bore musket, so surely was the breech-loader destined to be driven out by a new arm, and in November, 1877, Congress authorized the expenditure of twenty thousand dollars in the manufacture of a magazine rifle for military service.

Under this act a board of officers was assembled at the Springfield Arsenal on the 3d of April, 1878, to consider and recommend a magazine rifle; and after examining twenty-seven different patterns, the board recommended the Hotchkiss magazine gun as suitable for the military service. This was the beginning of the revival of the magazine-gun question, which had been abandoned at the close of the war; and from this time on the attention of the War Department has been directed towards the securing of a better armament than the single-loading Springfield. A number of the Hotchkiss rifles were placed in the hands of the troops, and reports upon them were directed to be made; but these reports were not entirely satisfactory, and in 1879 the question was referred to the equipment board, which reported in favor of the Lee magazine rifle. This was the first gun that had a magazine beneath the breech.

Again, in February, 1881, in the appropriation for the manufacture of small-arms at the National Armory, Congress directed that fifty thousand dollars be expended in the manufacture or purchase of magazine rifles to be selected by a board of officers appointed by the Secretary of War. To this board was submitted forty different kinds of magazine rifles, the principal ones being the James P. Lee, the Chaffee-Reece, the Hotchkiss, the Remington, and the Russell-Livermore, all American inventions; and two foreign inventions were presented, one by Joseph Schulhof, of Austria, and the other by F. Vetterle, of Switzerland. This board reported that the Lee, the Chaffee-Reece, and the Hotchkiss possessed efficiency as single-loaders, and, considering safety, ease of loading, rapidity of fire, endurance, and simplicity of construc-

tion, it recommended them in the order named. The Lee, Chaffee-Reece, and Hotchkiss rifles were issued to certain companies for trial, and, after careful consideration of the reports rendered, the chief of ordnance, General Benet, in December, 1885, reported to the Secretary of War that he was satisfied that neither of these rifles should be adopted. Of the three guns, however, the Lee proved to be much the best, but it was not considered by the army at large to possess all those qualities that are essential to a military weapon; still it may be said that the Lee is the original type from which the best magazine rifles of to-day have been developed.

Of the different classes of magazine rifles there are: 1, those in which the magazine is in the butt, like the Spencer; 2, those in which the magazine is under the barrel, like the Winchester; 3, those in which the magazine is over the barrel, like the Bethel-Burton; and 4, those in which the magazine is beneath the breech, like the James P. Lee.

In respect to their use, magazine rifles may be classified as: 1, single-loaders with cut-off magazine; 2, repeaters with no cut-off to magazine; and 3, detachable magazines; and all of them may be used as single-loaders when the magazine is empty.

Of all these different types it may be difficult to select the best, but the magazine rifle is going to be the weapon of the soldier in the near future. It is coming; it is here; it is here to stay, and, in the words of the immortal Tweed, What are you going to do about it? Out of the great number of rifles put upon the market; out of the great number that have been patented only to die like the great men who invented them; I say, out of this great variety of rifles, the question is, Which one shall be adopted for the use of the United States soldier, and, after it has been adopted, how shall it be used? The first part of this question has practically been answered, for the magazine-gun board, convened in November, 1890, and subsequently changed by various special orders, has recommended a rifle to the Krag-Jorgensen system; and the War Department has adopted it under the name of the United States magazine rifle. But whether this shall be the rifle used in the next war depends more upon the inventive genius of mankind than upon the fact of its adoption. It may be possible that another gun will put in its appearance which will be as much superior to the present magazine rifle as that arm is superior to the single-loader. New inventions will spring up and we cannot escape them, and, however much we may deplore these perpetual changes, it should be remembered that it is this constant childbirth which gives life to genius. Although the arming of an army is costly, we must follow the movement which leads us on, and at least once in every decade we should adopt the best military weapon that can be produced.

As to the utility of the magazine rifle there can be no doubt. We

need not look to foreign nations for examples of their usefulness. Plenty of illustrations can be gathered from the use of the Spencer in our own last war. In a lecture given on magazine rifles, Colonel Fosbery, of the English army, states: "I remember hearing a Confederate officer relate his first experience (in the American Civil War) of the Spencer magazine rifle, and though the name of the place has, I am sorry to say, escaped my memory, the other details have not. He stated that the Federals had occupied and stockaded a strong position on the top of a hill, commanding, if I recollect right, the passage of one of their great rivers, a position from which it was necessary they should be expelled if possible at once.

"A strong storming party was accordingly formed, and assembled at night-fall in a woody bottom at the foot of the hill. When the moon rose they commenced silently to ascend, until at last they saw just above them the long black parapet against the sky-line apparently without a defender. On some noise being made, however, the alarm was given, and in an instant the parapet was lined with heads, and a volley poured into the assailants at close quarters, which was almost instantly followed by a second.

"This was a war of surprises, and, coming to the conclusion that their enemies had double barrels and must now reload, the stormers cheered and rushed at the work; but they had reckoned without the Spencer. Five more volleys followed the first two without a second's intermission, and the broken remains of the party took refuge in the bottom to attempt that post no more.

"On another occasion a Federal brigade which had already suffered severely in action, and was reduced to a fraction of its original numbers, came in sight of a vastly superior body of the enemy, which instantly made preparations to attack, and moved down to them full of confidence, as my informant said, drums beating and colors flying. For a moment every one thought that all was lost. The officer in command, however, understood his business and knew his weapons. He ordered the magazines to be filled, the men to take such cover as they could find, and wait for the word of command. Nearer and nearer came the enemy, and still the thin line waited in silence. When, however, they got within a hundred paces, the order came out sharp and clear, and volley after volley from the repeaters mowed them down in an instant. The ranks fell one over the other in heaps, and the survivors, panic-struck at this sudden and unexpected slaughter, turned and fled, leaving the spoils of war to the enemy they had too soon despised."

Another illustration of the importance of magazine rifles is shown by Sheridan's cavalry, which were enabled by the power of the Spencer to detain until captured three whole divisions of Lee's retreating army, and the Comte de Paris states, in regard to the Spencer magazine rifle,

"It is an excellent weapon, the use of which spread more and more in the Federal army."

In considering the Krag-Jorgensen rifle the board "unanimously arrived at the conclusion that an arm showing itself to be an efficient single-loader, a rapid magazine arm, holding meanwhile that magazine in reserve with a cut-off plainly indicating to the officers which class of fire is being delivered, was the most 'suitable' for our military service;" but the reasons for this conclusion are not set forth. As all men have more or less individuality, it would probably have been a difficult task for the board to have attempted to reduce to writing the reasons for this conclusion; but if they had done so it might have aided in settling the much-disputed question as to whether the new arm should be a repeater or a cut-off gun.

Some officers favor the repeater, while others argue for the cut-off gun, and there is much that can be said in favor of either system; but whether the rifle should be simply a repeater or whether it should have a magazine with a cut-off is a question that can only be decided after long and constant use of the weapon by the soldier in the field. The principal feature in favor of the cut-off gun seems to be that, by having the soldier make a separate and distinct motion in order to bring the magazine into play, the officer is thereby enabled to tell at all times whether or not the magazine is being used. This theory, so plausible and so essential to the control of the fire, lacks but a single requisite to acceptance, and that is truth. In running a company in line, as skirmishers, at target-practice with the men at one pace interval, it is a well-established fact that the officer commanding cannot tell whether all the men fire exactly two shots or not. Even if he give his whole attention to the firing, the most that one officer can do is to watch five or six men on either side of his immediate front. Some men of the company may fire from three to four rounds in the thirty seconds, and I have yet to see the officer who can detect them. If this be true at target-practice, where there is no danger, and when the officer commanding the firing line has all his wits about him, with nothing to distract his attention, and with all his power of observation fixed upon the line of men before him, he strains his eyes to catch the culprit who dares to fire more than the regulation number of rounds, but cannot do it,—if this be true, I ask you how in the name of common-sense do you expect that an officer can tell on the battle-field, surrounded by death and destruction, watching the enemy and directing his men, whether the magazine of each rifle is turned off or not?

I give the officer commanding the firing line the credit of being a well-educated, high-minded gentleman, careful and exacting in all that pertains to his military duties; but some things are beyond the power of human observation, and in all probability he will not undertake to ascertain how many shots Sam Jones has fired during the brief time

that the company has been halted, or whether he used his rifle with the magazine turned on or as a single-loader. Hence, in deciding upon a magazine rifle for the military service, weight should be given to the mechanical principles and ballistic qualities of the rifle, and not to fanciful theories of its future tactical use. The bolt system of breech closure seems to possess many admirable features over the swinging block. Mechanically, the rotating action of the bolt for both loading and extracting is far superior to the lever action of the swinging breech-block of the present Springfield rifle. Those who have fired reloaded ammunition from the Springfied have doubtless observed the want of extracting power when the cartridge has for some reason stuck in the chamber, and the liability of breaking the extractor if the breech-block is suddenly forced up. It is a well-known fact that the solid drawn cartridge shell requires a strong extractor, and more especially if there is any grit or dust upon the cartridge when it is placed in the chamber of the rifle; because the discharge of the cartridge forces the shell against the sides of the chamber, and the particles of grit partially sinking into the metal tends to act as a binding cement.

The frequent failure of the breech-bolt in the Prussian needle-gun and the French Chassepot created an unfavorable impression in regard to the use of the bolt system, but the chief difficulty seems to have been due more to the cartridge then used than to the action of the bolt. The more simple the mechanism of a rifle the better, for the fewer the parts the less likely they are to get out of order; and the cut-off is simply a useless contrivance invented solely for the purpose of satisfying those who from the long habit of using the single-loader are opposed to what they consider too great an innovation,—a magazine rifle proper.

Some people seem to think that a magazine rifle without a cut-off necessitates that the ammunition be packed in clips, but this is an erroneous idea, and I have no doubt but that the Krag-Jorgensen rifle without a cut-off would be very satisfactory. The magazine could always be kept full of cartridges, for as soon as the soldier fired one round he could replace it with another, and in this way the magazine would always be ready for an emergency without any extra motions. Ordinarily the fire of advancing troops will be slow,—that is, not more than one or two rounds per minute; but whenever the enemy exposes large groups or other close formations, even at long ranges, the rapid fire of the magazine rifle should be brought to bear upon them, so as to compel these groups to deploy or seek shelter behind some friendly crest. In these cases probably not more than four or five rounds will be fired, and then the soldiers firing will have plenty of time to refill the magazine. In this way a sudden and intermittent fire may be kept up, and the rapidity of the magazine rifle utilized; and another advantage of this kind of fire is that it may be employed by troops in extended order.

The value of a magazine rifle, however, does not depend entirely upon the rapidity with which it may be loaded and fired, for, after a certain limit has been reached, what is gained in rapidity is lost in the accuracy of the fire by the soldier not having sufficient time to aim at any definite object. The number of men put out of action is the real factor that destroys both discipline and strength, and in military operations the question is not the number of rounds that can be fired in a certain given time, say two or three minutes, but the useful effect that can be produced in that time upon the advancing enemy; hence, in deciding on a rifle for military service, we must also consider the flatness of the trajectory, the accuracy of the rifle, and the power of penetration.

Perhaps the most important quality for a military rifle to possess is a flattened trajectory, for on this depends the length of the dangerous zones as well as the power of producing ricochets; and on these two factors greatly depends the useful effect of the fire. The idea is to sweep all the ground in front as far as possible, and in order to do this the mean trajectory should not rise more than five and a half feet above the ground even at considerable distances, thus eliminating the small errors in aiming or in estimating the distance to the object fired at. Of two rifles equally good, the one having the lower trajectory will be the more suitable for military use, as it possesses greater efficiency in covering the ground. So important is it to have a low trajectory, that nations have for years been endeavoring to get a stronger propellant than the ordinary black powder, and the fact that the new powders are smokeless is only a matter of secondary importance. The real object is to impart a greater velocity to the bullet, so as to produce a flatter trajectory.

In considering the effects produced by the flatness of the trajectory, accuracy must also be taken into account. Some rifles are very accurate, but they have high trajectories; thus we see that the flatness of the trajectory is not due to the same causes that produce accuracy, but as a rule the flatter the trajectory the greater the accuracy; therefore we should endeavor to increase the flatness of the trajectory of a military rifle rather than its accuracy, because great accuracy cannot be utilized by a mass of excited men.

The power of penetration is of great consequence when men are hidden behind slight earthworks, shelter-trenches, small logs, trees, etc.; for with a great penetrating power many bullets will take effect that would otherwise have been stopped without damage to the enemy. This is a great advantage, for unless their cover can be pierced it is next to impossible to dislodge from behind a slight earthwork a group of men armed with a magazine rifle, at least so long as their ammunition holds out. Experience points to a very extensive use of field-works in the next great war, so as to minimize the effect of modern

weapons; and the only way to obviate this is to increase the penetrating power of the rifle to such an extent that the ordinary shelter-trench will be pierced like so much smoke.

The faults of the magazine rifle are principally due to its complicated and delicate mechanism, therefore particular care should be taken to see that all the parts are strong and simple, and not liable to get out of order even when subjected to very rough usage; and, further, the magazine should admit of being easily and quickly loaded to its full capacity at any moment. Another feature of the magazine rifle, and especially those of the cut-off system, that demands special attention is their liability to jam or to feed up a cartridge when there is one already in the chamber. I am informed that even the Krag-Jorgensen rifle may be jammed in this manner if, while using it as a single-loader, the bolt be pulled back, a cartridge inserted but not caught by the extractor, and the magazine then turned on. How important this matter is may be demonstrated by the fact that some of the old muzzle-loading guns picked up after the battle of Gettysburg contained from eight to ten and even a dozen charges. This was probably due to the deafening din of the battle which drowned the individual report of the soldier's own firing, and in the excitement he did not notice that his gun had not been discharged. If this be true of soldiers using a gun that is difficult to load, how much more likely will they attempt to load double when all they have to do is to turn down a thumb-piece on the side of their rifle! It will be hard to find, however, a magazine rifle to which no objection can be made. They all have their good qualities and they all have their defects.

The German army is armed with the Mauser, model of 1888, the magazine-box being fixed under the receiver and in front of the trigger-guard. This rifle is of the repeating type having no cut-off, and it can be used as a single-loader only when the magazine is empty.

The Belgian army has been supplied with the Mauser also, but it differs slightly from the German. It has no cut-off, but it may be used as a single-loader by firing and replacing the first cartridge, the other four remaining in reserve. This rifle has also been supplied to the Argentine Republic.

Austria is armed with the Mannlicher, a rifle of the repeating type having no cut-off, but it may be used as a single-loader when the magazine is empty.

Roumania has a repeating Mannlicher, differing from the Austrian rifle only in its bolt mechanism.

The new French rifle, the Berthier, is also of the repeating type having no cut-off. The French are also converting the Lebel and reducing its calibre.

England has adopted the Lee-Metford, calibre .303, with a cut-off magazine fixed in front of the trigger-guard. The magazine is a box of

sheet steel holding eight cartridges, and it is inserted through an opening in the body just under the breech, and it is kept in place by a spring. The cartridges may be put into the magazine before it is put in place, or it may be filled while fixed to the rifle. The spring which holds the magazine in place is just inside the trigger-guard, and by a slight pressure of the finger the magazine may be detached, but in order that it may not get lost it is attached to the rifle by a few strong chain-links. A spare magazine is supplied the soldier to provide against accident. Practically this rifle is of the detachable magazine type.

Italy is being armed with the Carcano rifle, which is simply a modified Mannlicher.

The Mouzin is the new Russian magazine rifle, but is reported as not giving entire satisfaction.

Spain has adopted what is called the Spanish Mauser, calibre .276, and information from the Spanish battle-field of Milena is to the effect that cavalry has next to no chance at all against this new small-bore repeating rifle in the hands of infantry.

Holland has the Mannlicher with a cut-off magazine.

Switzerland has adopted the Schmidt, calibre .295, with a magazine for twelve cartridges beneath the breech, and there is a cut-off so that it may be used as a single-loader.

Sweden is now converting her large calibre Remington into a smaller calibre (.315 inch).

Denmark has issued to her army the Krag-Jorgensen rifle, calibre .315, with a magazine under and to the left of the receiver, holding five cartridges. This rifle is of the cut-off type.

Portugal is using the Kropatscheck of the cut-off type, having a magazine under the barrel, and it can only be charged with single cartridges.

The government of Japan is using the Murata of the cut-off type, with a tubular magazine lying under the barrel, calibre .315, and, while differing in some of the details of construction, it is very similar to the Kropatscheck.

In August, 1893, the Brazilian government decided upon a rifle of the repeating type similar to the Austrian Mannlicher, but of smaller calibre (.296 inch). The rifle previously used was the Comblain, calibre .43.

Chili has recently decided to change her small-arms armament, and, after extensive trials, the commission reported in favor of the Mauser, calibre .276.

The new Mexican rifle, the Daudeteau, seems to have a great many admirable features. The magazine has no cut-off, but the bolt may be pushed forward by pressing down the top cartridge with the thumb, and then locked; and in this way it can be used either as a single-loader or as a magazine gun. The one great feature claimed for it is

that it is impossible to make it feed double, and if this is true it is certainly a great advantage.

From this meagre description of some of the different magazine rifles now used by different nations, the inference may be drawn that one type of gun is best for one class of soldiers and another type for another class of soldiers, according to their training, disposition, and national characteristics; but the board of officers that recommended for adoption the Krag-Jorgensen rifle for the military service of the United States says, "Each of the different magazine guns examined can be placed in one of two general classes, dependent upon the manner in which their fire can be delivered.

"*First.* Those which, while the magazine is charged, cannot be used as single-loaders. These arms should more properly be termed repeating guns.

"*Second.* Those in which the magazine can be charged and then held in reserve while single fire is delivered, magazine fire being, however, available at any moment." And they further say that "this classification compelled the board to consider not merely the mechanical features of the guns it examined, but also their merits and defects as an armament; and from such consideration the board is of the opinion that magazine systems of the second class are more 'suitable' for our service than those of the merely repeating type." But nothing appears to have been said about the "merits and defects as an armament" of any of the magazine guns tested, most of the guns being thrown out by damage to the mechanism. Still I hope the rifle adopted will meet every expectation, and really be what it is claimed to be,—the best military rifle in the world.

But the magazine rifle is only one-third of the fighting machine, the other two-thirds being the soldier and the ammunition. It is impossible to separate entirely these three factors (though they may be treated of as independent questions), and each part should be thoroughly understood, so that when put together the machine will work smoothly and well. A fine rifle with no ammunition is worthless to the soldier, and a fine rifle with plenty of ammunition but with no soldier who knows how to use it, is of little account to the officer.

We all have ideas, and possibly very definite ideas, as to the way that the magazine rifle should be used on the battle-field, but few of us have the experience required to decide such an important question. People talk much and write a good deal about the "tactical use" of this new death-dealing instrument, and, in their endeavor to excel, some few have formulated a code of rules prescribing with a more or less degree of certainty the exact moment at which the magazine should be turned on and a shower of lead poured in upon the enemy like hailstones from a passing cloud. These they denominate the "critical moments."

This is all very fine in its way, but one thing should not be forgotten; and that is, the character of the men that will compose our armies in time of war. Upon this question there appeared in the *Revue des Doux Mondes*, in 1862, a philosophical and descriptive account by the Prince de Joinville, of the organization of the Rebel and Union armies, in which he says, "The officers, from the colonel down to the lowest in the rank, do not know the first word of the military art, and if they have any real aptitude for it, and have warlike qualities, it remains for them to prove it. The soldiers have no illusion on this point. 'They know no more than we do, we are well acquainted with them,' say they of those who command them. Therefore there is no superiority of knowledge on the part of the officer over the soldier, and no superiority of social position in a country where none is recognized. Most frequently, also, it is with the idea of becoming a candidate for political office that the officer has taken up arms.

"It is to make himself a name in the eyes of the voters, and these future voters are the soldiers. What would become of the popularity they expect to enjoy if they were rough to the soldiers, or showed themselves too exacting in the service? From all these causes result the want of authority with the officers and the want of respect among the soldiers. . . . Even from the first there were exceptions to this; some colonels, compelled by a real vocation or animated by an ardent patriotism, knew how to overcome these obstacles placed in their path. Sometimes an officer of the regular army, desirous of distinguishing himself, and having enough influence in his State, raised a regiment and obtained from it an admirable result. . . . Most generally, however, the chief is a comrade, only he wears a different costume. He is obeyed in every-day routine, but voluntarily, and the soldiers don't trouble themselves about him when circumstances become serious."

The above, I dare say, may be taken as a fair representation of our armies during the first part of the Rebellion, and the same conditions as to discipline are likely to occur in our next war, be it far off or near at hand; for our army is a multitude of citizens only to be enrolled in case of war, and the magazine rifle will have to be used when and how it can. And its true use, as demonstrated in actual battle, will probably vary very much from the rules laid down in European military text-books.

It is well enough to have a few guiding principles laid down to direct the minds of inexperienced officers and raw recruits in the proper channels, and set them to thinking along the proper lines; but there should be no cast-iron rules to handicap the American soldier in the performance of his highest duty,—killing the enemy of his country. Armed with the magazine rifle, the all-important point in actual warfare will be to escape observation and sneak upon the enemy in a series of small bodies, the only command being the signal of the sword

and hand. The advance "with all the pomp and circumstance of war, with drums beating and colors flying," so often described in the history of past battles, will be seen no more upon the field of death; yet the unseen thousands will advance to do and to die.

No doubt a steady advance of a line of standing men, marching shoulder to shoulder, would be a very imposing sight and have its effect upon the morale of the enemy; but such an advance is simply impossible. The men must advance individually, and individuality means responsibility, and each soldier is responsible to himself, to his officers, and to his country for the manner of his advance, the way he uses his rifle, and the effectiveness of his fire. His chief idea should be to kill as many of the enemy as possible without unduly exposing himself or wasting his ammunition without the possibility of hitting something or somebody within the lines of the enemy. This continual "popping away" of men, advancing singly yet collectively, may not at first be so very efficacious, especially at long range, but it enlivens their spirits, makes them forget their danger, and it must have a very great effect upon the morale of the enemy, who can only see a continuous line of flashes steadily advancing towards them, with no perceptible diminution.

I do not mean to counsel that there should be no control of the fire, for soldiers should be taught that strength lies in unity of action, and fire discipline is what makes this unity of action possible. The controlling power of the commander should ever be visible, but by control I do not mean that the officer should adjust the sight of the soldier's rifle, nor fix the attitude of the men while firing, for they will soon learn of their own accord to hug the ground; I do not mean that the officer should tell the soldier when to use cartridges from his belt or when to turn on the magazine; I mean that the officer should direct when the firing shall begin, when it shall end, when it shall be slow, and when it shall be rapid; and as prominent points present themselves the commander of the firing line should try to concentrate the fire upon them. This is a sufficient control of the fire; this is fire discipline, which simply means that the soldier shall be taught to regulate his fire according to the will of his commander, and the commands should be short and sharp, as, Commence Firing! Cease Firing! Slow Fire! Rapid Fire! There is no use of annoying the soldier about minor details; there is no use of attempting to shoot his rifle for him.

I know that this is not in accordance with the teachings of foreign text-books, but our army is an American army, our soldiers are American soldiers, and the boy who shoots the squirrel from the tall Eastern pine, and the man who hunts the antelope on our Western plains,—I say men who are marksmen by birth do not need to be told everything upon the battle-field. Soldiers should be taught to rely upon their own knowledge for the adjustment of their sights, and to know, without

being told at the time, how to get the most out of their rifles in cases of emergency. The battle-field is not the place to teach the soldier how to shoot. He must be taught how to use his rifle in time of peace, and in time of war when and where to use it.

The European idea seems to be that the officer should know everything and do everything, and the soldier should know nothing, never think for himself, and only do what he is told. M. E. Simond, in his "De la Tactique des Feux et des Armes à répétition" (1884), says, "It is useless for the soldier to learn anything else than to fire quickly, with the elevation ordered. The rest belongs to the leaders, especially the officers." Now, this depends entirely upon the manner in which the soldier is taught. Book-knowledge and practical education are two very different things. The first may be attained by study, and is easily forgotten; the second requires actual experience and demonstration, which leaves a lasting impression upon the mind; and in time of peace the soldier should be taught to habituate himself to what he will have to do in war. He must not in all cases depend upon an officer to think for him. He must act, and act according to his own judgment, when occasion demands.

When the breech-loading rifles were first introduced, and troops began to fight in extended order, it was advocated that the soldier did not require as much training as had formerly been the custom in the old close-order drills with the muzzle-loaders, and that the rapidity of fire would make partially-trained militia and volunteers much more effective; but this was far from being the case, and actual experience has demonstrated that troops armed with the magazine rifle require more practical battle instruction than ever before. When shall this instruction be given? We cannot wait until war has been declared; so it must be done by training our regular troops and organized militia in time of peace. Our tactical formations may be changed by the nature of the enemy and the kind of weapons employed against us, but the training known as fire discipline must never be relaxed if we wish to secure the full power of the magazine rifle.

Again, it has been argued that the fire action of cavalry is a matter of secondary importance, but this is a great mistake. Were it not for their fire-action, cavalry would play but an insignificant part in the great drama of modern warfare. The shock-action of cavalry can seldom be employed with success, and the *arme blanche* is practically a thing of the past. Statistics tell us that during the Franco-German War only one per cent. of the wounds inflicted were due to cold steel. In the battle of Sedan, the French cavalry was used with a good deal of boldness and vigor, the charges were pushed home for all they were worth, but without achieving any particular success worthy of note; and the German infantry sustained these charges principally in extended order, and in all the cases the cavalry suffered heavily.

The American Rebellion teams with instances of the fire-action of cavalry, and the long range and flattened trajectory of the modern rifle makes the fire-action of cavalry more important than ever before; and the cavalry soldier must not only learn to use the magazine rifle on foot but also on horseback.

The rifle for the cavalry should be the same as that for the infantry, only a little shorter, and it should use the same kind of ammunition.

As the supply of ammunition on the battle-field may be treated of as an independent question, all that need be said upon that subject this paper is that a full supply must be furnished, or the full efficacy of the magazine rifle cannot be obtained.

W. A. CAMPBELL,
Second Lieutenant Ninth Infantry.

A STUDY OF MILITARY DESERTION.

(Concluded from page 342.)

THE judge-advocate-general of the army, in his annual report for 1882, says, regarding desertion, "The ordinary offense of this character in time of peace is, in my judgment, generally too severely punished in our service. The severity of the punishment is clearly not proportioned to the criminal nature of the offense. But why should this be necessary in our army in time of peace, when recruits can so readily be procured and retained in the service. The great railroad and other corporations in the country, which employ many thousands of men, rarely or never lose their men *through desertion*, but the employment, though often severe and hazardous, is sought, and when procured retained. Service as a soldier in the army should be sought by able-bodied and vigorous men as a calling leading to honor and reward, instead of one from which such men flee by the thousand annually. There must be some defect in our military system, otherwise this would not occur."

It is hardly believed that this opinion would be expressed by the same officer in the light of present conditions. I think it is generally conceded to be a very difficult matter to obtain satisfactory recruits for the army in time of peace, even with all the advantage of the many improvements over the conditions prevailing in 1882. As to the great railroad and other corporations in this country, their employés desert by tens of thousands, and couple violence and destruction to both life and property with their forcible retirement from contracts and agreements.

The remedy offered by the judge-advocate-general was to "increase the pay gradually, so that at the end of five years' faithful service it would amount to twenty-five or thirty dollars per month."

Congress would hardly consider such a proposition to increase the appropriation for the pay of the privates of the army. Moreover, such increase of pay, considering the allowances of the enlisted man, would be an unwise advancement beyond what the average private soldier could earn in civil employment. The increase of pay becomes a different proposition when applied to non-commissioned officers. Here the compensation for ability, intelligence, and faithful service should be made as great as practicable. It is much too small at present.

General Sherman, then commanding the army (1882, his last year before retirement), referred to the report of the judge-advocate-general, and commented on desertions as follows:

"The desertion of his comrades in danger is, and ever should be, construed as the basest and most heinous crime possible to a soldier; whereas, of late years, under the benign influence of our Bureau of Military Justice, it has grown to be considered as of little more concern than for a laborer to quit his employer without leave or notice. I would be perfectly willing in trials for desertion to submit the case of each deserter to a jury of his own fellow-soldiers. It is a fact that desertion is gradually becoming stripped, in the public estimation, of its odious and dangerous character, and we find that desertions are increasing rather than diminishing. I therefore recommend that the pay of enlisted men be restored to what it was in 1865, at the close of the war, and that the punishment for desertion be more clearly defined by law and increased in severity. In any event, I invite the closest attention to this whole subject, believing it to be of vital importance to the interests of our military establishment."

Inspector-General Davis, in his annual report for 1882, says, "Many men do not look on the act of desertion as a criminal offense, but only a breach of trust. This great strain on the army must be investigated and removed. Punishment must be swift and severe."

A number of officers about this time advocated the purchase of discharges to give men an opportunity to leave the service in an honorable way to themselves and without particular loss to the government.

Now we find that the purchase of discharges, authorized under General Order No. 81, Adjutant-General's Office, of 1890, is proving inimical to the interests of the army, and the above order has been modified successively by General Order No. 96, of 1891, and General Order No. 32, of 1892.

It was confidently believed that a majority, if not quite all, of the men who left the service by way of favor as ten-year veterans, by purchase of discharge, and by favor for faithful service at expiration of three years, with three months furlough, would return to the service after a season of rest and recreation.

The record for the year ended June 30, 1892, shows,—

Kind of Discharge.	Discharged.	Re-entered.
Three-years men	880	94
By purchase	1452	142
Veterans	206	51

As under existing conditions the term of enlistment is practically reduced to three years for men of faithful service, it was recommended by the adjutant-general of the army, in his report for 1892, and renewed in 1893, that Section 2 of the Act of Congress of June 16,

1890, be repealed, and that the term of enlistment be fixed at three years, so that bad men as well as good may be discharged alike at its expiration.

And it is further recommended that the term during which an enlisted man may re-enlist, with increased pay, be established at three months instead of one, as now provided by law. The effect of this will be to give to the soldier his three months' absence without expense to the government and without burdening the rolls, as at present, and to enable him at its expiration to re-enlist, with pay, as though he had been continuously in service.

Colonel Richard I. Dodge, U.S.A., retired, has stated, regarding the above proposition to diminish the term of enlistment so that it will be fixed at three years in place of five, that, "if adopted, it would prove of no practical value to the service. The length of term is a matter of little importance, either to the government or to the soldier."

Colonel Dodge is in favor of purchasing discharges, and says, "By permitting enlisted soldiers, or their friends, to purchase their discharge, we open the door to a better class of recruits, men who would like to enter the army but are too sensible and wary to bind themselves for five years to a mode of life of which they know nothing; and we practically abolish desertion."

How do we know that this proposition embodies the great desideratum we are looking for? Where are the statistics to support it? As a matter of fact the few figures we have do not favor the scheme.

It is simply an opinion, like hundreds of others, sincerely given, important as based on long experience and observation, and yet lacking the substantial and indispensable support of statistics.

Ideals without facts and figures are like "Mugwumps" in politics. They represent a lot of lofty things, but are without a balance wheel.

There is no branch of the War Department where statistics are collected and employed with more completeness, skill, and success than in the medical service. The annual reports of the surgeon-general for the past eight years have exhibited untiring energy in this direction, embracing not only the records of our own army, but of the leading European armies, with comparative analytical statements and graphic illustrations, all of which are of the highest scientific value, as well as of practical utility, to the officers of our army, both of the staff and of the line.

Two important measures long advocated by the Adjutant-General's Office became laws in 1890. The first authorizes the establishment of Summary Courts for the prompt consideration of minor offenses, and the second provides that when the punishment is left to the discretion of courts-martial, it shall not, in time of peace, exceed a limit which the President may prescribe. It was anticipated that the adoption of a well-considered code of punishments for military offenses, except

those specifically prescribed by the Rules and Articles of War, would undoubtedly remove a great source of irritation and discontent, lessen the number of cases requiring formal action, and remove an essential cause for desertion. One of the visible effects has been to augment the number of trials for minor cases from 11,574 in 1889 to 16,670 in 1892, all of which increase occurs without any diminution in the number of trials by General Courts. In fact, the latter appears to have increased slightly.

The adjutant-general of the army, in his annual report for 1891, refers to desertion as a question of the "most vital importance to the army," and recommends "vigorous action," which, he says, must be exercised to "blot out the odious offense which so much reduces the efficiency of the army, adds enormously to the expense of recruiting, and is such a drain upon the political power of the country."

General Sheridan, in his annual report for 1884, when in command of the army, refers to deserters as men who "ascribe no value whatever to the sacred oath of enlistment. They become recruits simply and solely in order to gain some end entirely foreign to the welfare of the army. They enlist with the intention of deserting at the first opportunity. Others invent some valueless excuse for their discontent with the service, and desert at the first convenient opportunity. Some desert viciously without any particular reason. Many are utterly incorrigible offenders, and constitute that class of 'repeaters' who desert and re-enlist just as did the notorious 'bounty jumpers' of the last war."

All division and department commanders have, in their annual reports for several years past, recommended and urged the most vigorous action against deserters, and most of these officers appear to favor increasing the amount paid for the apprehension of deserters to one hundred dollars.

General Miles, in his annual report for 1888, says, "I regard the solution of the problem of desertion as of the highest importance to the welfare of the army. In this connection I agree with the inspectors of the army, who have recommended the abolishment of the Leavenworth Military Prison, as I am satisfied it does not meet the purpose for which it was originally intended, and that military prisoners can be much better employed in the police duties at the military posts than in the manner they are now employed at that prison; and this I am satisfied would result in the saving of one hundred thousand dollars annually to the government." In his report for 1890, General Miles says, "Desertion is the principal evil of the army, and the various methods resorted to to diminish this crime have not, to any considerable extent, accomplished success."

Archibald Forbes, the renowned English war correspondent, stated, in an article on the United States army in the *North American Review*

in 1883, that "two per cent. of the American army are in the United States military prison, and the most of them are deserters." What would Mr. Forbes have said had he known that less that fifteen per cent. of our desertions reach the military prison, and that this numerical value represents about the percentage of convictions by courts-martial for this first of military crimes?

Captain Pope, commandant of the Leavenworth Military Prison, writing of desertion, says, "Any one who can throw light on a subject of such paramount importance can confer a benefit on the army, and it would seem almost the duty of any officer, favorably situated for a study of this grave question, to take advantage of the opportunity.

"While, of course, any means of inducing a better class of men to enlist, such as higher pay, greater comforts, increased opportunities to rise from the ranks to a commission, and especially any elevation of the sense of obligation, would probably tend to decrease desertion, yet I hold that the true remedies must be sought in an analysis of the *causes of desertion.*"

From the comparatively meagre, broken, and scattered records of statistics available for my examination, which I have been able to gather, partially classify, and analyze, the following imperfect deductions may be made concerning,—

First. Causes of Desertion, as taken from records of Boards of Survey under General Order No. 145, Adjutant-General's Office, 1890, of courts-martial, and from personal reports of non-commissioned officers of the Ninth United States Infantry.

1. Aggrieved over results of trial by general court-martial.
2. Chronic deserters (repeaters).
3. Debts.
4. Enlisted to get transportation West.
5. Wanted to get to the mines.
6. Too much fatigue (extra duty).
7. Stoppages for clothing overdrawn.
8. Fear of punishment for crime.
9. Fear of pending surgical operation.
10. Dissatisfied with climate.
11. Home-sickness.
12. To get rid of his wife.
13. To join wife.
14. Failure to secure extra duty.
15. Influenced by relatives.
16. Fear of riding a bucking-horse.
17. Dislike of the service.
18. Incompatibility of mother-in-law.
19. Drunkenness.
20. Associations with lewd women.

21. To escape court-martial.
22. Induced to desert by comrade.
23. General worthlessness.
24. Fear of apprehension as an escaped convict.
25. Insane.
26. Disappointed at not getting his discharge.
27. To avoid practice march.
28. To avoid arrest by civil authorities.
29. Elopement with a servant girl.
30. Fear of detection for fraudulent enlistment.
31. To accompany his brother.
32. To better his condition.
33. Restless and discontented.
34. Enlisted to secure a home during the winter.
35. Domestic affairs and indebtedness.
36. Objected to target practice.
37. Had to get up too early in the morning.
38. Because of drinking and gambling.
39. General dissatisfaction.
40. To get married.
41. Enlisted to join a cattle outfit.
42. Enlisted to join the Salvation Army.
43. Enlisted to get near the World's Fair.
44. Dishonesty with company mess money.
45. Wanted a change of base.

Second. That desertions are most frequent in the first year of first enlistment.

Third. That there are probably two maxima as to frequency of desertion; the first in the first year of first enlistment, and the second in first year of second enlistment. The first maxima arising from immaturity. The second maxima arising from chronic vice fully developed.

Fourth. That the large majority of deserters are Americans.

Fifth. That Americans are too restive and unduly sensitive to make contented, obedient soldiers.

Sixth. That the German-Americans and Swedish-Americans make the most contented and successful soldiers.

Seventh. That desertion is least among colored troops.

Eighth. That in the case of white troops desertions appear to be least among the Germans and Swedes.

Ninth. That the largest percentage of desertion appears to come from regimental recruits. The depot recruit when he reaches the regiment is generally the "survival of the fittest."

Tenth. That the best recruits appear to be furnished by the general recruiting depots.

Eleventh. That regimental recruiting tends to remove prejudice

from among the mass of the people against service in the army, by disseminating correct information concerning the nature and conditions of the military service, and the inducements afforded to young men to enter the army.

Twelfth. That desertions from the mounted service depots are greater than from the general service or infantry depots.

Thirteenth. Desertions are greatest in percentage of strength from the cavalry, next from the artillery, and last from the infantry, although there are a number of cases where the infantry is placed second as to frequency.

Fourteenth. Desertions from the engineer corps are greater than from any other staff corps of the army, and almost double those from the ordnance corps.

Fifteenth. That desertion from the West Point detachment has been greater than from both the Signal Corps and the general non-commissioned staff, and that desertions have ceased from the two latter during the past five years, but show no diminution at West Point.

Sixteenth. That recruits from farm life appear to be less successful than those from the cities in acquiring and performing the duties of a soldier.

General Sherman stated in his reports on the war of the Rebellion that city men generally made better soldiers than those from the country. The latter were not accustomed to irregular diet, late hours, and long periods of excitement and nervous strain as were the free and easy city men, yet their bravery and fidelity to every trust and duty *was never questioned.* In this connection it is interesting to note statistics compiled by the superintendent of the Military Academy, covering a period of fourteen years, from 1873 to 1886 inclusive, showing the parentage of cadets. By far the greatest number come from the farming class, almost double the number from the two other maximum sources,—viz., merchants and lawyers. The superintendent adds that the above statistics afford a complete refutation of the charge of exclusiveness or favoritism in regard to appointments to the Academy. In a table taken from Cullum's *Register* is shown the occupations of those graduates of the Academy who have left the army for civil pursuits, and it appears that the largest number have become farmers and planters, and the next largest civil engineers, and the third, professors and teachers.

This country has reason to be proud of her farmer's sons, for they have been "first in war, first in peace, and first in the hearts of their countrymen" for over a century of her existence.

Seventeenth. That the majority of rejections of applications for enlistment are Americans, and that the maximum cause is minority; second, intemperance; third, general unfitness; fourth, under height; and fifth, defective vision.

Eighteenth. That the occupations at the time of enlistment are in the majority laborers; second, soldiers; third, farmers; fourth, clerks; fifth, teamsters; sixth, sailors; seventh, musicians; eighth, carpenters; ninth, painters; tenth, bakers; eleventh, blacksmiths; twelfth, shoemakers. The remainder are divided among nearly fifty different occupations.

Nineteenth. The occupations of those who desert and are confined at Leavenworth are first in number laborers; second, clerks; third, painters; fourth, carpenters; fifth, teamsters; sixth, barbers; seventh, firemen; eighth, farmers; ninth, shoemakers; tenth, blacksmiths. The remainder are divided among fifty-one occupations.

Twentieth. The nativity of those who desert and are confined at Leavenworth are first in number Americans (over seventy-three per cent.); second, Irishmen; third, Englishmen; fourth, Germans; fifth, Swedes.

Twenty-first. While the death-rate among colored troops is about four per cent. higher than among white troops, the discharge-rate is greater for the latter, owing to the influence of intemperance and venereal diseases in producing greater disability among the white troops. The lowest death-rate (3.95 per 1000) in the history of our army occurred in 1890, and the second lowest, 4.76 per 1000, occurred in 1885.

Twenty-second. The percentage of rejection of white candidates for enlistment is greater than for colored, and greater for Americans, Irishmen, and Englishmen than in the case of Germans and Swedes, considering physical disqualification, and excluding rejection for "lack of knowledge of the English language."

Twenty-third. The percentage of desertion in the British army appears to be only about one-fourth as great as in the American army, and yet both depend upon voluntary enlistments. In the German army the difference is probably still greater against us. In the British army, with an actual enlisted strength in 1874 of about one hundred and eighty thousand men, the percentage of desertion was a little over 4.3, and in 1875 about 3.1. Whereas in the American army for these years the percentage was 22.8 in 1874, and 12.4 in 1875.

Desertions are least during field service, and reach their maximum when the British troops are at home in garrison life, near towns and cities. In India desertion is physically impossible except at the two or three seaports where troops are stationed.

Twenty-fourth. Desertion in the American army is a most serious and expensive evil, and the remarkably high percentages indicate a great drain upon the resources of our military establishment and a constant menace to discipline.

The enormous additional expense of recruiting and the drain upon the political power of the country may be shown by the facts, as re-

ported by the adjutant-general, that fifty thousand men have been disenfranchised and twenty-eight million dollars lost to the treasury in the twenty-four years preceding 1892.

Can it be that the average yearly desertion in our very small army has cost us the enormous sum of over one million dollars? A larger sum than the British empire pays the Bank of England for the management of its public debt of many billions. During the Civil War the Union forces lost one hundred and ninety-nine thousand men by desertion, and the Confederates one hundred and thirty-five thousand, the expense to the Union side for these bounty-jumpers being estimated at about two hundred million dollars.

Twenty-fifth. The true extent of the evil of desertion is not shown by the percentage of the actual enlisted strength of the army. All non-commissioned officers must be eliminated from the total used; and, moreover, it is still necessary to restrict the total to the actual number of new enlistments, so that the real loss by desertion, based on an enlistment of 7950 recruits for 1892, is 17.4 per cent. instead of 6.8 per cent., as determined from the total enlisted strength of the army.

Twenty-sixth. Discharges under General Order No. 80, of 1890, are becoming a source of large expense to the government which must be obviated. Beginning with three discharges in 1890, they increased to 939 in 1891, 1452 in 1892, and 1573 in 1893, involving a total outlay to the government, as shown by the adjutant-general, of over three hundred thousand dollars annually, besides the loss of experienced men.

The government had much better resort to a fixed term of enlistment at three years, and thus save the large expense attending the three months' furlough. But it must not be forgotten that the discharge of enlisted men, under the operation of the law of June 27, 1890, involves the presence in the ranks of an increased number of recruits to keep the army to its authorized strength.

Twenty-seventh. "Discharges by order" (generally based on the application of the man under the influence of his friends, parents, or wife), and for "minority," are a constant source of expense to the government to the amount of from fifteen to twenty thousand dollars annually. But the action thus taken is in the direction of preventing desertion, and may be endured.

Twenty-eighth. From a study of the records for 1889, it appears that location, season of year, climate, healthiness, or insalubrity of military posts have but slight influence on desertion.

Twenty-ninth. The late Adjutant-General Kelton asserted in his annual reports that desertion in the American army ought to be reduced to two per cent. of the actual enlisted strength, and that this "percentage would necessarily represent the reckless, restless, dissipated class, with deficient moral sense, who could probably not be kept out of

the army by the most vigilant recruiting." He said, further, "Severe punishment and high rewards will not prevent desertion, because the infliction of the former and the offer of the latter would shock public opinion and deter men from enlisting. All that can be done in the matter is to make military administration so perfect that the soldier will have no cause to desert his colors."

SOME SUGGESTIONS AS TO IMPROVEMENT AT MILITARY POSTS, HAVING IN VIEW AN INCREASE OF DISCIPLINE, EFFICIENCY, AND CONTENTMENT AMONG THE MEN.

First. Post gymnasiums for recreation, athletic exercises, and for drills during the winter months where such exercises are prevented outside.

Second. Post laundries for the washing of men's clothing, for which a partial allowance should be made, and thus remove a source of enforced expense and a means of discontent.

Third. Post tailor-shops at regimental head-quarters, under charge of the post-quartermaster, to make, alter, and repair the clothing of all enlisted men. The chief tailor and assistants to be paid by the Quartermaster's Department. This will avoid a prominent source of discontent arising from ill-fitting clothes and the additional expense thrown upon the soldier for changing misfit garments. Good-fitting garments tend to make good-appearing and contented soldiers.

Fourth. A sort of special service corps for the Quartermaster's Department, to be enlisted particularly for the duties in that department, and thus relieve the professional soldier from all fatigue outside of his company requirements.

Fifth. In connection with recruiting, to provide a special form to be used by civilians in recommending a man for enlistment; that the wording of the form, its appearance, and the manner of certifying to the honesty and accuracy of the statement be such as to forcibly impress upon the civilian the importance and seriousness of the statement he is about to make. This will tend to raise the tone of public appreciation of service in the army.

Sixth. A useful little manual on the subject of entering the army, to be published by the War Department and distributed to the public through the post-office and other public offices, and from military garrisons. These manuals, while free from any importuning, and from seductive glamour about the service, should be made attractive in form and matter, and tell all that it is necessary for the recruit to know, coupled with remarks as to pecuniary and other advantages. The manual should give the list of recruiting offices, how to address and where to find them; information as to the duties and course of instruction at recruiting depots, and also as to clothing, messing, amusements, and post-school.

These books should be given out by public officers, when applied for, and not then unless the applicant bears good appearance and offers a reasonable request for the information. Circulars should be published and distributed calling attention to the books, their importance, and how and where they can be obtained.

Seventh. An officer could, with advantage, be specially detailed by the War Department to work up an exhaustive report on the subject of desertion. It might require two years to complete such an investigation, including the preparation and printing of the report; but whatever the time, the practical and theoretical value of it would easily compensate for all labor and expense attached thereto.

Eighth. Continue recruiting at the depots, and form schools of instruction there, the period of intuition being not less than three months and as much longer as may be necessary to determine the fitness of the men for assignment to regiments. The recruiting depots should strive in every possible way to sift out worthless men. If a recruit proves to be unproductive of any worth as a soldier, discharge him forthwith, and with as little expense to the government as possible. In the case of regimental recruiting this "weeding out" would have to be accomplished by the companies. There are advantages to be attained through regimental recruiting, especially in the saving of clothing and in the acquirement of company duties, which cannot be obtained elsewhere.

But of what value are improved tactics, modern formations, the highest science of strategy, improved fire-arms, and the highest efficiency of infantry fire, if the machine force of the army, its very bone and sinew, are moth-eaten by the insidious influence of desertion? Of course, some will reply that it costs money to maintain an army anyway. But this appears to be begging the question and admitting defeat.

In conclusion, I am constrained to say that the results attained in this brief review of an exceedingly important subject are necessarily imperfect and tentative. While the information at hand is voluminous in theoretical opinion, it is wanting in some of the essentials of scientific value, and by that I mean actual knowledge based on original investigation.

It is conceded on all hands that the problem is exceedingly difficult, and yet each new writer deals largely in opinions rather than facts. It is, of course, a technical question and demands expert knowledge; yes, knowledge that will be worth more than one million dollars a year to the army. Where is the man who can and will work out the solution of this problem? Was ever a more honorable prize offered as the reward for genius and application?

The consensus of professional opinion frankly admits the seriousness of the situation. General Miles says we are approaching the

solution, but very slowly. General Stanley says we have only found that men enlist, become discontented, and leave, usually in the first and second year of their enlistment.

The late Adjutant-General Kelton made a considerable number of recommendations in his annual report for 1891, looking to the prevention of desertion. These improvements in the pay and surroundings of the soldier contemplated the following separate items: $352,500; $228,000; $2,736; $60,000; $10,000; $100,000; $75,000; or a grand total of $828,236 annually.

Yet this large sum falls short of the annual expense of desertion, which amounts to about 4.5 per cent. of the appropriations ($26,000,000) for the support of the entire army. The bulk of the adjutant-general's annual reports for the past five years pertain to recruiting and desertion, so important is the subject.

Of course, wars have been carried on in spite of all kinds of casualties, and will continue to be so conducted, and the necessary expenditures are generally looked upon as extraordinary, and demanded by an extreme emergency, affecting the very existence of the country. But in time of profound peace, and especially when the military establishments of the present day demand the highest degree of efficiency in organization and technical training, and must be maintained at great expense, it is absolutely essential to watch every drain upon the resources of an army. Fatal imperfections, or those likely to become so, cannot be tolerated.

The imperfection we are attempting to reduce to a harmless minimum is closely associated with both *material* and *administration*. The latter has been changed immensely, so that the American soldier now lives in comparative luxury (better than any other soldier in the world, and far better than the laboring man of his own social position), and has few restrictions placed upon his liberties.

Suppose now that an attempt is made to change the *material* (the enlisted force), and look for men naturally suited to the requirements of military obedience, discipline, and energy, and at the same time develop expert knowledge among recruiting officers in selecting them. It might be well to consider the availability of German and Swedish Americans in this respect.

Perhaps this suggestion may be somewhat idealistic, but I have already called attention to some data which point in the direction of the kind of material here considered. Although recruiting officers reject about seventy per cent. of the applications for enlistment, yet we do not appear to be obtaining the right kind of material, and this is fairly indicated by the circumstances of desertion. May I also call attention to another lead which may be worked vigorously under certain conditions, and from which good results ought to proceed? I refer to that tremendous source of power for good or evil known as *Public Opinion*,

which exerts a most important influence upon the social standing of the enlisted man in the community where he may be stationed, and, in fact, upon the whole garrison.

In this connection the highest responsibilities, involving a delicate sense of justice and propriety, frequently rest upon the commanding officer and his assistants, and no easy task must be accomplished.

In any event, before another decided change in policy is attempted, or at least as soon as it may be deemed practicable, I think the reader will agree with me that every interest of our little army, with a century of glorious history, demands an exhaustive statistical investigation of that most unfortunate and serious of military crimes,—*desertion*.

Since the completion of this paper recent legislative and War Department measures, in the interest of the enlisted man, provide for the repeal of the ten-year Proctor law, a reduction of the term of enlistment to three years, the abrogation of "detained pay," the probable abolition of "retained pay," and a reduction in the reward for the apprehension of deserters from sixty dollars to ten. These are important measures, and indicate the efficient watchfulness and vigorous policy of the War Department.

JOHN P. FINLEY,
First Lieutenant Ninth Infantry.

HILL-SIDE FARM.

"GOOD-NIGHT, lieutenant, and many thanks for your courtesy."

"Good-night, Mr. Brooks. Remember and send me a paper."

And with these words, Lieutenant Barr, officer of the main guard of the brigade of —— State Militia, encamped upon the reservation at Fressingfield, shook hands with the reporter of the *Daily Planet*, and returned to his quarters with the guard, while the reporter, his recent guest, disappeared in the darkness.

Hugh Brooks, the reporter, had spent the hours from tattoo to midnight in collecting material for a characteristic sketch of a militia encampment, which was to appear in the *Daily Planet* under the caption of "A Night with the Guard." Provided with a pass from head-quarters, which served as introduction and credentials, he had made the acquaintance of the officer of the guard, by whose permission and assistance he had been able to witness the full details of night duty, including the arrest of two drunken civilians, a party of soldiers whom the provost guard had found outside the lines, and three or four of the caterer's colored assistants who had been "shooting craps" in a mess-tent and adding thereto the heinous offense of burning a light after taps; and now that the camp had settled down to sleep after midnight, he was returning to the reporters' building at brigade head-quarters to grind out copy before getting a little sleep.

Head-quarters were situated in an angle of the field formed by two roads, one of which ran south to Fressingfield, two miles away, and north, beyond its junction with the other road, to Normansburg, a small manufacturing village, between which and the town of Fressingfield lay some five miles of country dotted with farms interspersed with tracts of woodland. On the sides next the roads the head-quarters buildings were guarded by a strong and high fence which formed two sides of a square, the opposite sides being formed by a line of sentries.

The principles of guard duty had been zealously inculcated at this camp on account of an unusually large proportion of new recruits; and it was for this reason that Brooks had been instructed to send in a special story descriptive of the manner in which the guards performed their duty. He had been much impressed by the vigilance and ac-

tivity of the sentries whom he had noticed during his peregrinations of the night.

"Lucky I got this pass," he reflected as he walked towards his destination, which was hidden in a thick mist which had closed in after sunset, "for the way these fellows keep guard is a caution, and a civilian who isn't *en règle* stands a first-class chance of getting left if he tries to pass them."

A few steps more brought him in sight of the head-quarters buildings which loomed dimly through the mist; and the next instant he heard the sharp challenge of a sentry, "Who comes there?"

"A friend," answered Brooks, walking up to the point of the sentry's leveled bayonet.

"Advance, friend, with the countersign."

"I've advanced, but I have no countersign," replied Brooks. "But here is a pass signed by Colonel Cook, assistant adjutant-general, —is it all right?"

"I can't read it in the dark," answered the sentry; "and it's no good, anyway. Passes don't go after taps."

"The deuce you say! Why's that?"

"Orders," briefly responded the sentry, still maintaining an attitude of hostility with his bayonet.

"But this pass says, 'All guards and patrols will pass the bearer at all hours.'"

"That may be, but I can't read it; and my orders say, 'Pass nobody without the countersign after taps.'"

"Well, call the corporal and see what he says."

"All right;" and the sentry's voice went booming through the mist, "Co-o-o-rpral of the guard, number seven**TEEN**!"

The cry was taken up along the line, and in a few minutes the non-commissioned officer came running up.

Brooks stated his name, quality, and destination to the corporal, who, having no means of reading the pass, declined to look at it.

"I've no doubt it's all right," he said; "but we've got our orders not to pass the governor himself after taps unless he has the countersign. You're a newspaper man, and if we should break orders for you, you'd be the first one to roast us for it, wouldn't you?"

"You're right, corporal," replied Brooks, laughing, although considerably vexed at the situation, for the mist had turned to a chilly rain, which was decidedly uncomfortable. "Of course, you must go by your orders. But what am I to do?"

"Don't know," said the corporal, briefly. "Officer of the day or officer of the guard might pass you, but I can't."

Brooks reflected. It was evident that his pass had been issued without knowledge of the special orders of the guard for the night, and that the sentries could not pass him without committing a gross

violation of duty. It was impossible to tell where the officer of the day might be, and to hunt for him would probably be a fruitless quest. Lieutenant Barr had been relieved and was probably asleep in his own quarters by that time. It might be necessary to disturb several persons before one could be found who possessed sufficient authority to countermand the orders of the guard in Brooks's case, and this Brooks was averse to doing. The corporal, who was in immediate command of the sentries at head-quarters, was compelled to remain with them, and could not be expected to leave his post to assist Brooks. The situation was exasperating, but Brooks could not fail to recognize that it had also its comic side.

There seemed to be no alternative except to remain on the field in the rain, or to walk to Fressingfield, two miles away, and sleep in a hotel. While Brooks was trying to make up his mind which to take, his memory suggested a third course.

Some time before he had received a letter from a friend, a regular army officer, who had boarded during a previous encampment at a place called Hill-side Farm, situated on the Normansburg road about half a mile from the field. Major Carpenter had written a glowing account of the beauty of the place, and of the hospitality of the proprietors, and had urged Brooks to spend a few days at Hill-side Farm during his vacation. Brooks had thought but little of the matter, but now it recurred to his mind with full force.

"It's a bad hour to go there," he thought, "but if those people run a boarding-house they must be accustomed to being disturbed at uncanny hours. Besides, I can pay them for any extra trouble. Well, corporal," he said, aloud, "if you can't let me in, you can let me out, I suppose?"

"That's all right," said the corporal. "Come along to the gate and I'll pass you out."

As they walked rapidly along through the rain the corporal gave a half-explanatory, half-apologetic discourse on the duties and responsibilities of the men under his command. "You see," he said, "these sentries have got their orders, and they *can't* do anything but just stick to 'em. And I've got to *see* that they stick to 'em. Wouldn't do for me to take any responsibility when I get my orders straight, see? Like as not if I passed you in, and you didn't go to work and put it in the paper, it would be all right and no harm done; and then again, like as not some of the mugs on guard here might talk about it, and if Cap Hyde, my company commander, got onto it, *I'd* get it in the neck. Like as not I'd lose my stripes. Regular crank Cap Hyde is on discipline; but the boys all like him, and he's got a mighty good company."

They soon arrived at the gate which was in the corporal's charge. This was not the main entrance to the reservation, but one sacred to

the use of the officers at head-quarters. It was guarded by two soldiers who stood each in a sentry-box, well-muffled in his overcoat with the cape drawn over his fatigue-cap. Before passing out, Brooks asked the corporal if he knew the location of Hill-side Farm.

"Hill-side Farm?" said the corporal, "well, I should say I did. You follow the Normansburg road to a place where it forks; then you take the straight road to your right; that's the new road, and the other is the old one that leads right on to it again a little past the farm; then you go on until you come to a little cart-path cut through the bank on your left; that takes you on to the old road again, and you go on to the house a little way beyond." He gave a low laugh and went on: "Tell you how I came to know the place. I was running from the provost one night, about two years ago, and I tried to give 'em the slip by dodging through the cart-path on the old road. But they knew the place and got after me to beat the band. As I got near the house I saw two ladies standing by the stone wall. I says, 'The provosts are after me! where can I hide?' and one of the ladies pointed to a path that led to a patch of woods a little way off. I ran and got under cover just as the provosts came up full gallop. One of them spoke to the ladies, and I saw them point down the old road, and the provosts started off without looking towards the woods, and I took my time about getting back to camp."

"I suppose the recording angel must have dropped a tear on that occasion," remarked Brooks.

"Don't know," answered the corporal, upon whom the allusion was evidently lost; "but those women saved *me* from dropping some tears,—that is, if the provosts had got me. Here, boys, let this man pass out. Thanks. I'll smoke this after I'm relieved." This last remark referred to a cigar which Brooks slipped into the corporal's hand as he left.

The rain was falling quite heavily by this time, and Brooks found his half-mile walk anything but pleasant. By keeping a sharp lookout he had no difficulty in finding the cart-path and in following the "old road" to the house, which he reached just as the rain began to descend in sheets. Sheltering himself under a small porch, which, being wreathed with vines, offered some protection from the deluge which was drenching everything outside, Brooks applied himself to the huge knocker on the door, and gave a succession of blows like those of a blacksmith on his anvil.

"That ought to rouse them," he remarked, as he desisted a moment to observe what effect his summons produced. But it did not, and he was obliged to give a second and a third volley of raps before an upper window was thrust up, and a voice, scarcely distinguishable above the loud patter of the rain, demanded,—

"Who is it?"

"Is this Hill-side Farm?" asked Brooks.

"Yes. What do you want?"

"To speak with the proprietor."

"Who are you?"

"A man who is almost drowned in this rain!" answered Brooks, sharply, for a stream of water which had begun to trickle down his spinal column was disturbing his usual equanimity.

"Wait a minute," said the voice, and Brooks waited.

It was several minutes before his waiting came to an end, but the sight of lights glancing in the upper rooms kept his patience good, and he was finally rewarded by hearing steps approaching the door, which was presently opened. An elderly man stood before him holding a lamp, and behind him appeared a younger woman, both dressed with evident haste.

"Excuse me for disturbing you," said Brooks, "but can you let me have a room for the rest of the night?"

The old gentleman looked at him sharply before answering. "Who are you?" he at length demanded.

"My name is Brooks, a reporter of the *Daily Planet*. I'm well named, too, for the water is running from me in streams," he added, unable to suppress a mild joke upon his condition and appearance.

"Well, step inside," said the old gentleman.

The invitation was not particularly cordial, but Brooks accepted it with alacrity. As soon as he was in the house he stated briefly but fully the causes which led him to seek shelter at Hill-side Farm. His story did not appear to produce an altogether favorable impression upon the minds of his hosts, who regarded him with evident suspicion.

"We are not keeping boarders this year," said the woman, who had not previously spoken.

"It would have been better for you to have gone to a hotel at Fressingfield," said the old man.

"What, in this rain? Hardly," answered Brooks; "especially after Major Carpenter had said so much in his letters to me about the kindness and hospitality of the people at Hill-side Farm."

"It is strange that we never heard the major speak of you," said the woman.

"Probably he had no occasion to," answered Brooks. "But you see how I am situated. Your house is the only shelter I can possibly get now. Give me a room and I'll pay you any reasonable price for it and the trouble I may put you to. If you refuse I must walk in the rain until morning,—that's all."

"Oh, we wouldn't turn anybody away in such weather," said the woman, in a burst of kindliness. "Wait right here for a few minutes and we'll see what we can do for you."

The man and woman then retired into another room, leaving

Brooks to await the issue of their conference. Brooks was somewhat irritated by their apparent hesitation, though he could not but admit to himself that his arrival at such an unusual hour, coupled with his bedraggled appearance, might well cause some embarrassment. But he was most disturbed by their manner, which was manifestly full of suspicion. It was plain that they did not wholly believe his story, although they had refrained from expressing any doubt in words. Though Brooks belonged to a profession which is popularly supposed to inculcate liberal views in regard to mendacity, he strongly objected to having his word doubted, in private matters at least; but he felt that it was useless as well as ridiculous to show offense when he was at the mercy of the doubters.

Presently the woman re-entered, and bidding Brooks to follow her, led the way up a flight of stairs to a room containing a bed and some other articles of furniture, all of an antiquated pattern. "You can sleep here," she said, and, bidding him good-night, she retired quickly as if afraid to remain with him an instant longer than was necessary. As she closed the door Brooks heard a sound as of a key being turned in the lock; and on trying the door a moment later he discovered that he was in reality locked in.

What could it mean? Why should his hosts, who appeared to be unwilling to receive him at first, be so anxious to retain him as to make him a prisoner in his room? And if this was their intention, could they seriously expect that a light deal door with a clumsy, old-fashioned lock would prove an effective barrier in case he really wished to leave the room? Brooks found himself unable to solve the mystery.

The room was close and stuffy, although a window was open. It was evidently not a room which was in general use. It was low-studded, and a great beam which extended the length of the ceiling, its sides roughly squared as if by an ax and covered with lead-colored paint to match the rest of the woodwork, bore testimony to the antiquity of the house. There were three windows in the room, and, what was unusual in a sleeping-apartment, three doors, one at the head of the bed, one back of it, and the third, the one by which he had entered, at the opposite corner of the room. There was also another door, leading evidently to a closet, and still another placed near the ceiling and covering an aperture about two feet square, which led, as Brooks judged, to the unfinished regions under the ridge-pole.

Brooks made these observations as he removed his clothing, which was much less the worse for the wet than he had expected. His light overcoat was indeed badly soaked, but his under garments, with the exception of his trousers below the knee were only slightly damp. Some sheets of copy-paper which he had placed in one of his pockets before starting out that evening were dry enough for writing; and as Brooks felt no immediate disposition to sleep, he sat down at a table to

write a portion of his story for the *Daily Planet*. He had no need to hurry about it, for the story was good any time before the camp closed; but Brooks thought he might be able to write himself to sleep as he had done on several previous occasions.

But Brooks soon found that sleep when wooed is most elusive. Instead of the drowsy languor which he expected to experience within a few minutes after setting about his task, he found that his wakefulness was, if possible, increased. Nor was he able to make satisfactory progress in his work. His mind stubbornly refused to concentrate itself on the memoranda recorded in his note-book, and his ideas failed to arrange themselves with their customary regularity. His thoughts would constantly recur, in spite of his efforts to direct them into other channels, to the singular actions of the people of the house; and at length he laid down his pencil and gave up his work in disgust.

At that moment a sound caught his ear and caused him to listen with tense nerves. In another instant he had become convinced that some one was stealing softly towards the door of the room. The sound was repeated,—a board seemed to creak slightly under the pressure of a stockinged foot; and to dispel his doubts, if any remained, there was a slight jarring of the latch. Some one was trying the door. Then the sound ceased and silence reigned again.

This incident produced a decided effect upon Brooks's nerves. He was not in general subject to nervous tremors, and he felt angry at himself because he could not control the feeling which had seized upon him. Every nerve was strained to the utmost tension. His sense of hearing had become painfully acute. He heard the beating of his heart distinctly, and a pulse seemed to throb in his temples. The rustling of the leaves of his open note-book by a slight breath of air from the window caused a sharp thrill to run through him from head to foot; and he found himself glancing involuntarily towards the doors near the bed as if in anticipation of their sudden opening. In short, Brooks found himself suddenly and unaccountably attacked by a "spell of nerves."

He had recourse to his cigar-case, that never-failing comforter. But even here he failed to find the soothing influence which he so much desired. His cigar drew badly, and when he had corrected this defect by cutting the butt almost entirely away, the wrapper began to uncoil and the ash to form unevenly. He threw the cigar out of the window and tried to compose his mind by reflection. But his reflections only added to his discomfort. Why was he locked in? and what meant that mysterious visit to his door? These questions *would* occupy his mind to the exclusion of all others. He tried in vain to reason with himself. Surely there was nothing to apprehend. The idea that he could be in any danger was supremely ridiculous. The truth was,

he was tired; he had drunk strong coffee at supper; he had got wet and out of temper; the result was that his whole system was disturbed, and the best way to correct it was to lie down and let sleep come when it would.

Just as he came to this conclusion he became aware that the room was growing darker. A glance at the lamp showed the cause,—the wick was above the oil. Brooks glanced at his watch; the hands indicated three o'clock. Allowing that an hour had elapsed between the time when he left the guard-house and that of his arrival at the farm, he had been in the room about two hours. He looked out of the window; the rain had ceased, and where the sky was clear the stars were already paling. Extinguishing the lamp, he threw himself on the bed with his face to the wall, and in a few minutes found himself gently journeying to the realms of Morpheus.

Suddenly he was aroused as if by a galvanic shock. The latch of the door near the head of the bed clicked; and a long pencil of light streamed into the room as if from the crevice between the door and the sill. But before Brooks could make up his mind as to its reality it had disappeared, and no further sound was heard. Brooks lay awake several minutes trying to decide whether this last episode was a dream or an actual occurrence. But Nature was applying her own remedy to his system, which was naturally strong and healthy; the reaction had set in and drowsiness soon overpowered his thoughts; and at length he slept as soundly as a criminal on the night before his execution.

When he awoke the morning was well advanced. A long bar of sunlight was streaming through one of the windows, and the singing of birds reached his ears. As he shook himself awake his experience of the night came back to his mind, and he could not help smiling at the feelings which had kept him awake so long. He dressed himself, and on looking at his watch found that the hour was past eight. As he completed his toilet the thought came to him,—was he still locked in? But on trying the door he found it unlocked; and he went downstairs more than half convinced that the events of the night were the vagaries of a dream.

At the foot of the stairs he met the woman who had shown him to his room. Her manner had undergone a decided change since he had last seen her, a few hours before, for, instead of regarding him with evident suspicion and fear, she bade him a cordial good-morning, at the same time ushering him into a little parlor. "I did not call you," she said, "because I knew you must be tired; but if you will wait here a little while I will have breakfast ready for you. Or, if you prefer, you can step outside and get a breath of morning air before you eat."

Brooks preferred a saunter in the open air, and was well rewarded for his choice. A keen admirer of nature, he found much to interest

him in the situation and surroundings of Hill-side Farm, where the taste of the occupants had spared much that would have ordinarily been marred by neglect or sacrificed to bucolic vandalism.

The house with its barns and out-buildings stood on the crest of a ridge which sloped with an easy descent down to the road which he had traveled the preceding night, and which swept with a wide curve under the shade of some mighty elms. Beyond the road was a broad flat divided by well-built stone walls into fields, the cultivation of which seemed to give promise of rich crops. Farther on the ground rose in ridges of varying height crowned by woods. The farm buildings were surrounded by orchards of apple- and peach-trees, under which the tall grass was ready for the scythe; and where the ridge was not cultivated it was covered with dense growths of pine- and walnut-trees. Under the bright sun and cloudless sky of a summer morning the scene presented rare charms to Brooks, whose eyes, accustomed to the sights of a city, took in the rural prospect with delight.

The clang of a bell from the house warned him that breakfast was ready, and a few moments later he found himself discussing a succulent meal with Mr. and Mrs. Fowler, his hosts, whom he soon found to fully deserve the encomiums which Major Carpenter had bestowed upon them in his letters. Brooks was much puzzled to reconcile their cordial but unobtrusive kindness and hospitality with the suspicious and constrained demeanor which they had displayed the previous night, especially when they gave him to understand with all possible delicacy that they would accept no pecuniary recompense for their trouble. Several times he was on the point of asking for an explanation; but he could not bring himself to do so, and at last concluded to lay the blame of the inexplicable events to his own imagination.

During the meal Brooks referred to the advice which the major had given him to spend his vacation at Hill-side Farm; and as the Fowlers expressed their willingness to receive him as a boarder, since he would not consent to be considered as a guest longer than that day, he decided to follow his military friend's advice. Accordingly, after breakfast, having written his story for the *Daily Planet*, he added a note to the editor, stating that as his period of rest began at the close of the encampment his address for the next two weeks would be at Hill-side Farm; and then proceeded to the camp to resume his journalistic duties.

Brooks spent the following fortnight at the farm, and enjoyed his stay immensely. It was not, however, until the eve of his departure that he succeeded in unraveling the mystery of his first night's experience there.

He was sitting on the lawn with Mr. Fowler, enjoying a smoke in the cool of the evening, when Mrs. Fowler joined them.

"So you really must go to-morrow?" she asked.

"I must," answered Brooks, "and I am very sorry for it. You would think that strange, though, if you knew that my first impression of this place was anything but agreeable."

"Do you mean on account of the first reception we gave you?" asked Fowler.

"I do," said Brooks. And then in a humorous manner he described the incidents which led to his "attack of nerves." When he had ended, Fowler remarked to his wife, "You had better tell him our side of the story."

"Well," said Mrs. Fowler, "you'll think it foolish, of course, but you must allow for the circumstances. A few days before the camp opened a robbery was committed in a house near Normansburg. A man came there one evening and asked the people of the house to lodge him for the night. Although he had no money, they saw that he was too well-dressed for a tramp, and he told them some kind of a story that worked upon their sympathies, so they took him in. That night when all the family were asleep he got up, took everything of value that he could find, and went away without making any noise. Of course, after that everybody was alarmed and suspicious of strangers; and when you came at such an hour and told such a queer story it frightened us a little, especially as we couldn't refuse to take you in out of the storm. You remember how we left you in the entry while we went into the parlor to talk it over. Well, we decided that we would lock all the doors of your room and keep watch all night. After you had gone up-stairs and we found that your light was burning for a long time, we went up and tried your door to make sure that it was still locked. We heard you moving in the room, and this frightened us still more, as we couldn't imagine why you should stay up so long if you were—all right. Then after your light went out I went up to the other door and tried that. I couldn't hear a sound in the room, and I didn't know whether you were asleep or waiting to get out and go through the house. We were frightened mostly because my son and both the hired men were away that night, and my husband is an old man who couldn't do much against a robber, if you had proved to be one."

"And you sat up all night for fear of me?" asked Brooks.

"Yes, for neither of us could sleep with the uncertainty hanging over us. I was wretchedly nervous, and imagined all sorts of things. But just before daybreak we went up to your door again, and we heard you asleep,—for you *did* snore dreadfully,—and then we concluded that your story was all right, and that we had been very foolish. And after the men-folks got back in the morning I unlocked your door, and hoped that you'd never find out about it, especially after we got to know you."

Brooks laughed.

"It's the first time I was ever taken for a robber," he said. "I suppose I shall be taken for a Congressman next. But if you had known the condition that your precautions put me into you would have slept as soundly as I did later on."

When Brooks resumed his desk in the office of the *Daily Planet* he related this story to the editor as something too good to keep.

"If that yarn is true," said the editor, "you had about as queer an experience as happens in ordinary life."

"I'll vouch for the truth of it," said Brooks, "and as for its queerness,—well, you should have been in my place to appreciate it."

"You ought to write and publish it," said the editor.

"Perhaps I may some time," answered Brooks.

"If you don't, I will," said the editor.

Jos. B. Rowell.

ORIGIN AND DEVELOPMENTS OF STEAM NAVIGATION.

(Continued from page 364.)

1847.—THE BREMEN LINE.—The first *American* transatlantic steamers after the "Savannah" (1818) were the "Washington" and the "Hermann," constructed in 1847 to form a monthly communication between New York and Bremen. The hulls of these sister ships were built by Westervelt & Mackay and the machinery by Stillman, Allen & Co., of New York. The following were their general dimensions:

	"Washington."	"Hermann."
Length on main-deck	230 feet.	235 feet.
Length on spar-deck	236 "	241 "
Breadth of beam	39 "	40 "
Depth of hold	31 "	31 "
Average draught	19½ "	19½ "
Tonnage C. H. measurements	1700 tons.	1800 tons.
Kind of engines	two side lever.	two side lever.
Diameter of cylinders	6 feet.	6 feet.
Length of stroke	10 "	10 "
Diameter of paddle-wheels	34⅔ "	36 "
Average speed per hour	11 knots.	. . .

Several alterations were made in the boilers and paddle-wheels after their first construction.

1850.—THE HAVRE LINE.—The "Franklin," constructed in 1848, and the "Humboldt" in 1850, built to be added to the Bremen Line, were built and equipped by the same firms as those of the Bremen Line, but were placed by Messrs. Fox & Livingston to run between New York and Havre. Their average passages from New York to Cowes, from January 1 to December 1, 1852, were 12 days, 17 hours, 9 minutes, and from Cowes to New York 12 days, 22 hours each.

The general dimensions of these two steamships were,—

	"Franklin."	"Humboldt."
Length on deck	263 feet.	292 feet.
Breadth of beam	41⅔ "	40 "
Depth of hold	26 "	27 "
Average draught	18 "	19½ "
Breadth across the paddles	32 "	72 "
Diameter of paddle-wheels	32½ "	35 "
Engines	two side lever.	two side lever.
Diameter of cylinders	7¾ feet.	95 inches.
Length of stroke	8 "	9 feet.
Tonnage	2400 tons.	2850 tons.

Each had four iron flue boilers, placed back to back.

The New York and Havre Steam Navigation Company, to which these steamships belonged, was established in 1848, to ply between Havre and New York, stopping at Southampton both going and returning, and obtained a contract for carrying the United States mails, for which they were to receive one hundred and fifty thousand dollars per annum for a fortnightly service. The "Franklin" was launched in 1848, and made her first voyage in 1850. In July, 1854, she was wrecked and totally lost on Long Island. The "Humboldt" made her first voyage in 1851, and was wrecked entering Halifax, Nova Scotia, in October, 1853.

To preserve the mail contract, the service was supplied by chartering unsuitable steamers at heavy cost until 1855–56, when the "Arago" and the "Fulton" were built and placed on the line. On the breaking out of the Rebellion, in 1861, the line was withdrawn. The "Arago" was sold to the Peruvian government, and the hull of the "Fulton" was broken up, dry rot rendering her useless as a sailing-ship. Her engines were utilized elsewhere.

The "Fulton" (1856) was built by Smith & Denison under the superintendence of Captain Wm. Skiddy; the engines by the Morgan Iron Works. Her dimensions were: Length on deck, 290 feet; breadth of beam, 42 feet 4 inches; breadth over all, 65 feet 6 inches; depth of hold, 31 feet 6 inches; tonnage, custom house, 2300 tons; tonnage, cargo, and measurement, 3000 tons; diameter of cylinder, 65 inches; length of stroke, 10 feet; diameter of paddle-wheels, 31 feet; length of paddles, 9 feet; number of paddles on each wheel, 28 feet; width of paddles, 18 inches; and shafts of wrought iron. She had two iron Martin boilers with vertical seamless brass tubes, 12 feet long, 30 feet wide, drawn from ingots by the American Tube Company, Boston, and a fire and heating surface of 9100 square feet. The "Fulton" had three decks. On the berth-deck she had accommodation for 150 first- and second-class passengers, and could accommodate 300; and she could carry 800 tons of coal and 700 tons of freight. Her draught of water was seventeen and a half feet. She was furnished with two inclined oscillating engines.

Mr. Rainey, in his work on "Ocean Steam Navigation," says, "When one of our first American mail steamers sailed for Europe, no practical marine engineers could be found to work her engines. She took a first-class engineer and corps of assistants from one of the North River packets; but as soon as the ship got to sea and heavy breakers came on, all the engineers and firemen were taken deadly seasick, and for three days it was constantly expected the ship would be lost."

1848.—THE "CALIFORNIA."—The steamer "California," which left New York on the 6th of October, 1848, was the first steamer to bear the American flag to the Pacific Ocean, and the first to salute

with a new life the solitudes of that rich and untrodden territory. She was soon followed by the "Panama" and the "Oregon," and in due time by the "Tennessee," the "Golden Gate," the "Columbia," the "John L. Stevens," the "Sonora," the "Republic," the "Northerner," the "Fremont," the "Tobago," the "St. Louis," and the "Golden Age." These steamers found nothing ready to receive them in the Pacific. The company was compelled to construct large workshops and foundries for their repair, and had also to build their own dry-dock, that of the government at Mare Island not being ready until 1854. For a large portion of the early time the company had to pay thirty dollars per ton for coal, and once as high as fifty dollars per ton.[1]

1848.—THE USE OF IRON FOR STEAMERS DISTRUSTED.—In the report of a Parliamentary committee on the state of the British navy in 1848, it was said, "Contradictory evidence was given the committee as to the applicability of iron to the construction of war steamers, and the committee therefore offer no opinion on the matter. The present Board of Admiralty distrust the use of iron in the construction of war steamers; and the committee consider that while so important a question is in abeyance, the expenditure of a large sum for constructing such vessels must be regarded as an inconsiderate outlay of the public money."

DUBLIN AND HOLYHEAD PACKETS.—In 1848 the "Banshee" and the "Llewellyn" commenced to run between Dublin and Holyhead as mail packets, and on their trial trips attained a speed of upward of eighteen statute miles per hour.

The public soon required faster and more commodious steamers, and in 1860 the "Connaught," "Ulster," "Munster," and "Leinster," iron steamboats, were built, of the following dimensions: Length between the perpendiculars, 334 feet; beam, 35 feet; depth, 21 feet. They had a central keel-plate 3 feet deep, $\frac{5}{8}$-inch thick, with two bars 9 inches deep. They had nine iron water-tight bulkheads. The "Leinster," on her trial, made twenty and a half statute miles. The "Connaught," twenty and three-quarter statute miles. Each of these vessels cost near £80,000 when complete in all respects for sea.

1849.—THE "MINT."—R. B. Forbes, of Boston, Massachusetts, in 1849, sent to California, on the deck of the ship "Samoset," an iron steamer called the "Mint," about seventy-five feet long by fifteen beam. She was stowed on the starboard side of the ship, the deck-house being removed over to the port side to balance her, *and was launched under steam.* She was the first American steamer to ply on the Sacramento. In 1850 he sent an iron paddle-wheel steamer in two parts to China on the deck of the brig "Rolling Wave," on account of Captain J. B. Endicot.

1849.—The "Sansom," the first *screw* steam tug in the United States, was built by Messrs. Cramp & Sons in 1849.

[1] See account of this company under head of Ocean Steamship Company.

1850.—First Steamer on Lake Titicaca, Peru.—A small iron *steamboat* was built by Mr. George Birbeck, Jr., of New York, intended to ply on Lake Titicaca, Peru. She was 55 feet keel, 12 feet beam, and 5 feet hold, and was propelled by two high-pressure engines of 10 horse-power each, connected at right angles. Her wheels were of wrought iron 10 feet in diameter. The boat was put together in New York, and each piece marked. She was then taken apart to be shipped. No piece was to exceed 350 pounds, as on its arrival at Lima it was to be transported on mule-back to Lake Titicaca, which is 140 miles long.

1850.—The Twin Steamer "Gemini."—In the autumn of 1850 Mr. Peter Borrie launched what he called a "safety iron twin steamer," which he appropriately named the "Gemini," adapted for carrying goods, passengers, cattle, and all sorts of vehicles, and for either ocean or river navigation.

This vessel was chiefly constructed of iron, having two separate hulls placed side by side (with a space between them in which the paddle-wheel worked) strongly connected together at the deck (which passed over all), and also by a plate-iron arch and stays between the hulls. The hulls thus joined afforded a great extent of deck-room with a very small amount of tonnage, or of resistance from the area passing through the fluid; and, as both ends were exactly similar, it was expected the vessel would steam with equal facility either way without turning. The keels and stems were not placed in the centre of the hulls, but towards the inside of them, thus making the water-lines very fine on the inside, to diminish the tendency of the water to gorge up between the hulls, found to take place in twin steamers as usually constructed; which gorging tends to separate the two hulls and increases their resistance in passing through the water. The inner bilges of the two hulls were fuller than the outer ones, to afford a greater degree of buoyancy on the inside, necessary to support the weight of the deck, etc., between the hulls. The vessel was adapted for river navigation, at a high degree of velocity; but a vessel for sea purposes would require to be made broader in proportion to her length, according to the trade in which she was to be placed.

The "Gemini" was one hundred and fifty-seven and a half feet long and twenty-six and a half feet broad on deck, each hull being eight and a half feet broad, with a space of nine and a half feet between them. Her frames were of angle-iron and spaced, the outside plating being securely riveted to them. The keels were formed by curving the plates downward so as to form channels for the bilge-water inside of the hulls; but in sea-going and other vessels, where the draught of water would be greater, Mr. Borrie proposed keels of iron bars, and to rivet the garboard strakes upon them in the usual way. The plating was not carried to the top of the frames on the inside of the hulls, except at the space in the middle for the paddle-wheel, but was carried

up to the deck, so as to form an arch between the two hulls, which were also bound together with iron stays at the springing of the arch. The deck-beams were of T-shaped iron, securely fastened at the ends to the frames, and at the middle to the top of the arch. The deck-planks were fixed to the beams by screws passing through the flanges of the beams, and calked and made water-tight in the usual way. Each of the hulls was divided into compartments by water-tight bulk-heads. There were also fenders of angle-iron, one at each end, to prevent boats, etc., from getting into the canal or space between the hulls. The deck was bounded by bulwarks, which had two large gangways on each side, hinged at the lower side to the decks, and lifted up or lowered by winches attached to the bulwarks. On each end of the paddle-box were a number of deck-houses,—a cook-house, with apparatus in it for cooking by steam, a state-room, a dining-room, engineer's room, etc. On the top of the deck-houses and paddle-box was a platform, or hurricane-deck, upon which the steering-wheels were placed; and, being properly railed in, could be used as a promenade for passengers.

The vessel, having to steam with equal facility either way without turning, was fitted with a rudder at each end. The rudder was in the middle of the canal between the hulls, and was formed of an iron plate upon a shaft or spindle coming up to the deck, which shaft was not in the centre of the plate but about one-third of its length from the one side, so that the pressure of the water against the rudder acted partly on both sides of its centre of motion; but when the rudder was left free it always accommodated itself to the direction of the vessel's motion, one end being longer than the other from the centre of motion.

The steering-wheels were on the top of the paddle-box in the middle of the vessel; thus the man at the wheel, from his elevated position, had a clear view. The clear area on deck for passengers, including the hurricane-deck above the accommodations at each end of the paddle-box, was two thousand six hundred square feet, and the area of the cabin floors was six hundred square feet, so that there was ample accommodation to carry from eight hundred to one thousand passengers with ease and safety.

1851–52.—AVERAGE PASSAGES OF THE CUNARD AND COLLINS STEAMERS.—There was great rivalry in 1851-52 between the Cunard and Collins lines of steamships between England and the United States, which resulted as follows:

In 1851 the Collins Line in fourteen trips from Liverpool to New York, averaged 11 days, 8 hours. The quickest trip was made by the "Baltic," in 9 days, 13 hours. The longest by the "Atlantic," in 13 days, 17 hours, and 30 minutes. In fourteen trips from New York to Liverpool the average time per trip was 10 days, 23 hours. Quickest trip by the "Baltic," 10 days, 4 hours, 45 minutes. Longest by the "Baltic," 12 days, 9 hours.

In 1851 the Cunard Line, in fourteen trips from Liverpool to New York, averaged 11 days, 23 hours, 30 minutes. Quickest trip by the "Africa," 10 days, 16 hours, 50 minutes. Longest by the "Europa," 17 days, 2 hours, 50 minutes. In fourteen trips from New York to Liverpool the average time was 10 days, 13 hours. Quickest trip by the "Africa," 10 days, 5 hours, 35 minutes. Longest by the "Europa," 14 days, 3 hours.

In 1852 the Collins Line averaged, in thirteen trips from Liverpool to New York, per trip, 11 days, 22 hours. Quickest trip by the "Atlantic," 10 days, 3 hours. Longest by the "Pacific," 15 days, 4 hours, 30 minutes. In thirteen trips, the same year, from New York to Liverpool, the average was 11 days, 1 hour. Quickest trip by the "Arctic," 9 days, 13 hours, 30 minutes. Longest by the "Baltic," 12 days, 21 hours.

In 1852 the average of thirteen trips of the Cunard Line from Liverpool to New York per trip was 13 days, 3 hours, 3 minutes. Quickest trip by the "Asia," 10 days, 19 hours. Longest by the "Niagara," 20 days, 19 hours. In thirteen trips from New York to Liverpool the average was 11 days, 5 hours. Quickest trip by the "Asia," 10 days, 5 hours, 10 minutes. Longest by the "Asia," 12 days, 21 hours, 30 minutes.

In 1860 the Collins steamer "Baltic" made the trip from New York to Liverpool in 9 days, 13 hours, 30 minutes.

1851.—THE "HIMALAYA."—The screw steamship "Himalaya" was launched on the anniversary of the Queen's birthday, May 24, 1851. The launch was witnessed by the directors of the Peninsular and Oriental Company, for which the vessel was built, and a noble and fashionable assembly. The naming was by Lady Matheson, wife of Sir James Matheson, chairman of the company. On a given signal, shortly before high tide, the vessel glided gently into the water amid the cheers of the spectators.

The "Himalaya," designed and built under the inspection of F. Wattman, Jr., at Blackwall, was commenced in November, 1850; her length between perpendiculars was three hundred and forty feet; breadth, forty-six feet two inches; depth of hold, thirty-four feet nine inches; and she was three thousand five hundred and fifty tons burden, and had engines of seven hundred horse-power. She was intended to have paddle-wheels, with engines of twelve hundred horse-power, but before she was too far advanced it was decided she should be fitted with a screw propeller and engines of seven hundred horse-power on the most approved principle. She carried twelve hundred tons of fuel, with accommodation for four hundred cabin passengers, five hundred tons measurement goods, and had ample space for mail-rooms, etc. In strength of build and form for speed the "Himalaya" was at that day unrivaled, having six water-tight bulkheads, and she was fitted with

every appliance for safety. She was provided with "Trotman's improved Porter's" anchors, the bower-anchors weighing respectively forty-eight and fifty hundredweight, in lieu of ordinary anchors of five tons each. The cabin arrangements with regard to ventilation were excellent, and combined elegance with simplicity.

1852.—THE "FRANCIS SKIDDY."—The magnificent side-wheel steamer "Francis Skiddy," which plied between New York and Albany in 1852, was built by George Colyer. She was three hundred and twenty-five feet in length, thirty-eight and a half feet beam, eleven and a half feet depth of hold. Her engine was of one beam, seventy-inch cylinder, and fourteen-feet stroke. Her water-wheel was forty feet in diameter, twelve feet face, thirty-three-inch bucket. She had four low-pressure boilers, twenty-four feet long, nine feet face, capable of seventy pounds of steam, with a blowing-engine attached to each of twelve-inch cylinder and twelve-inch stroke. Her consumption of fuel was two thousand pounds per hour. Her draught of water, five and a half feet. As a provision against danger she had three fire-pumps,—two to work by hand and one by steam, with six hundred and fifty feet of hose attached, together with fire-buckets, a life-preserver for every passenger, and a supply of Francis's metallic life-boats, etc. Her appointments were magnificent. The main cabin, three hundred feet in length, was capable of seating five hundred people, and was arranged in the most commodious manner. There was also an immense saloon, opening upon sixty state-rooms. This was surmounted with a dome or arch, decorated with stained glass, which cost ten thousand dollars.

1852.—THE "AUSTRALIAN," THE FIRST MAIL STEAMER TO AUSTRALIA.—The "Australian" was the first to make the mail steam voyage from England to Australia. She was built at Dumbarton, for Messrs. Cunard & Co., for the Canadian trade. She steamed from Plymouth, England, on her first voyage to Australia June 5, 1852, and reached King George's Sound, West Australia, August 20; Adelaide, August 29; Melbourne, September 2; and returned January 11, 1853, having completed the voyage in two hundred and twenty-one days, one hundred and sixty-five of which were under steam and sails, and fifty-six in port, taking in mails, coal, and lading. The following account of her voyage *out* is extracted from *Chambers's Journal* for 1854:

"The public mind was excited to a pitch of feverish anxiety concerning the gold discoveries in Australia, and, in order to provide for the delivery of mails to and from the colony with greater speed and regularity, a company was formed, pledged to effect this by a line of great steamships. Even then people who ought to have known better confidently predicted that direct steam communication with Australia was impracticable. As in the case of crossing the Atlantic, nothing

would convince them or settle the question but actual performance. Now, as the distance to be run is little short of sixteen thousand miles, it is obvious that no ship, unless of enormous size, could carry sufficient fuel to perform the entire voyage under steam without stopping to take in coal at stations on the way; and this has caused hitherto considerable delay and great additional expense. The pioneer was the 'Australia,' a large new Clyde-built iron steamship that first started from London, and, after some accidents and delays, finally left Plymouth with the mails on the 5th of June, 1852, under command of Captain Hoseason. She anchored at St. Vincent on the 16th to take in coal, which had previously been sent to the depot there from England. This occupied three days. The ship then proceeded on her voyage, and, after coaling at St. Helena, reached the Cape of Good Hope on the 19th of July, where she again coaled, sailing from Table Bay on the 22d, and anchored in King George's Sound, West Australia, on the 20th of August. There she received coal from a ship sent out with a cargo from England expressly for her, and a few days afterwards proceeded to Adelaide, which she reached on the 29th, and Melbourne on the 2d of September. This was the first voyage performed by a steamer from England to the antipodes. In some respects it was a badly-managed voyage, much unpleasantness occurring among both passengers and crew, repeated accidents happening to the machinery, and the coal running short between the stations, so that at times the engines stopped, and the vessel had to lie to or proceed under canvas. Nevertheless, it effectually demonstrated the practicability of the enterprise. She was followed by the 'Great Britain,' and steamships now perform with punctuality and dispatch the voyage to and from Australia, calling at the Cape both on the outward and homeward passage to land and receive mails and passengers, equal to that which distinguishes the Atlantic and Mediterranean steamers. Taking into consideration the prodigious expanse of ocean to be traversed, this is a triumphant realization of the most sanguine hopes of those who have watched the progress of steam navigation."

1852.—FASTEST STEAMERS IN THE ROYAL NAVY.—The second edition of Murray's "Marine Engine," published in 1852, states that the "Terrible," the "Sidon," and the "Odin" are "probably the *fastest* war steamers properly so called in the Royal Navy. Of these, the 'Terrible,' with 226 feet length, 42 feet beam, 28 feet hold, and 17½ feet load draught, attained a speed of ten knots per hour on trial with sea stores and guns on board. The 'Sidon' (Sir Charles Napier's ship) with 210¾ feet length, 36½ feet beam, and 27 feet hold, and with two engines of 6½ feet stroke, and 86½ inches diameter, has a speed on trial of ten knots; while the speed of the 'Odin' is superior to either, being eleven and one-quarter knots, also on trial; the average sea speed of the three being not to exceed nine knots. The few

steamers then in the navy of the United States equaled in speed these at that time exceptionally fast steamers of the Royal Navy."

1852.—Commodore M. O. Perry, in a letter to the Secretary of the Navy, February 8, 1852, wrote, "An ocean steamer of 3000 tons is of the maximum dimensions for safety and efficiency, whether for *war* or commercial purposes." He did not foresee the immense ironclads and passenger steamers that a quarter of a century would develop.

1852.—THE PENINSULA AND ORIENTAL COMPANY was the first to adopt screw steamers for its regular service. In 1852 the "Chusan," of seven hundred and sixty-five tons, and the "Formosa," of six hundred and seventy-five tons, were placed upon the route between Hong-Kong and Shanghai. These were succeeded by the "Bengal," of two thousand one hundred and eighty-five tons, and the "Candia," of nineteen hundred and eighty-two tons, between Suez and Calcutta.

In 1852 the iron steamer "Thistle," while proceeding along the coast, struck a rock on the north of Ireland, and steamed thence without assistance to Greenock, seventy nautical miles across the north channel, with the fore-deck under water, the fore and after compartments filled with water, and only the centre or engine compartment free. She returned to Greenock by the power of her own engines without assistance. The fact of a vessel of only six hundred and seventy tons steaming across the Irish Channel safely, with her holds and cabins full of water, the mid-compartment only free, affords a strong testimony of the efficiency of water-tight bulkheads.

1853.—THE ASPINWALL LINE, originally established by Messrs. Howland and Aspinwall of New York, by an arrangement with the Law Line, performed mail service exclusively between Panama (on the Pacific coast), California, and Oregon, under government contract.

The steamers of this line in the mail service in 1853 were the "Golden Gate," the "Tennessee," the "Columbia," the "Panama," the "California," the "Oregon," and the "John L. Stevens." The "Golden Gate" was completed in 1851, and made a trial trip to Annapolis, where she was visited by the President of the United States, members of his Cabinet, and other distinguished persons.

The following were the principal dimensions of these steamships:

DIMENSIONS.	Columbia.	Tennessee.	Panama.	California.	Oregon.	Golden Gate.	J. L. Stevens.
Length on deck	220 feet	212 feet	200 feet	200 feet	200 feet	265 feet	280 feet
" " keel	219 "	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	270 "
Breadth of beam	29 "	35 feet	32 feet	33 feet	34 feet	40 feet	40 "
Depth of hold	13 "	22 "	21 "	20 "	20 "	22 "	26 "
Tonnage	. . . . .	. . . . .	1087 tons	1050 tons	1100 tons	2030 tons	2450 tons
Engines	side lever	side lever	side lever	side lever	side lever	oscillating	oscillating
Diameter of cylinders	57 inches	75 inches	70 inches	70 inches	70 inches	85 inches	85 inches
Stroke of piston	5 feet	8 feet	8 feet	8 feet	8 feet	9 feet	9 feet
Diameter of paddle-wheels	22 "	32 "	26 "	26 "	26 "	31 "	32 "

1853.—THE "FORFORO," a small iron screw steamer of forty-three tons and forty horse-power, rigged as a three-masted schooner, sailed July 17, 1853, from Liverpool for the West coast of South America, and arrived at Valparaiso November 15. The passage occupied one hundred and twenty-one days,—forty-six under steam and sail, and twenty-eight under sail alone. She used in all one hundred and sixty tons of coal, and averaged six knots all the way. She was the smallest steamer that ever performed so long a voyage.

1854.—THE FIRST STEAMER TO CIRCUMNAVIGATE THE GLOBE.—In 1854 the English screw steamship "Argo," eighteen hundred and fifty tons register, returned to England from Australia *via* Cape Horn, and was the first steamer that had circumnavigated the globe. She made the passage out to Australia *via* Cape of Good Hope in sixty-four days, and returned *via* Cape Horn in the same time. Since the ancient days of Jason and his "Golden Fleece" several celebrated ships have borne the renowned name of "Argo," and certainly we consider the present steamer not the least worthy of the number to be chronicled in history. She has proved herself one of the most notable pioneer ships of the nineteenth century.

1853–54.—THE "GOLDEN AGE."—The American paddle-wheel steamer "Golden Age" arrived at Liverpool in 1853, where she attracted much notice. She was of great size and power, built with all the latest transatlantic fashions and improvements, one of which was she had no bowsprit!—something our English brothers then thought—though they have learned to know better—as indispensable as the nose on a man's face. Her owners resolved to send her to Australia, and she made the quickest passage out on record up to that time. But her subsequent voyage was far more memorable and important. On the 11th of May, 1854, she left Sydney, and in thirteen days reached Tahiti, where she took in the enormous weight of twelve hundred tons of coal. This occupied her six days; and on the 31st she sailed direct for the Isthmus of Panama, which she reached on the 19th of June, the passage from Sydney, including the long stoppage mentioned, thus being performed in about thirty-nine days! This wonderful feat was rendered more remarkable from strong head-winds during the first part of the voyage and an estimated current against her course equal to an extra seven hundred and sixty-eight miles. From Tahiti, however, the sea was so smooth and the passage so mild that a canoe might have come the whole distance in safety. She arrived at Panama just in time to transfer two hundred passengers, her mails, and a million sterling in gold to the West Indian steamer "Magdalena," at Chagres, and consequently letters from Sydney to the 11th, and from Melbourne to the 5th of May—only sixty-seven days from Sydney!—were received in London on the 18th of July, 1854.

"Thus to American skill and enterprise," says the *Edinburgh*

Journal, "credit is due for first opening direct steam communication across the vast Pacific, in that manner connecting Australia and Europe by the medium of Panama. We cannot read without regret that the spirited proprietors of the 'Golden Age' have incurred a dead loss of several thousand pounds by the experiment, solely owing to the cost of coal at Tahiti. But they have shown what can be done, and nothing can be more certain than that ere long arrangements will be made sufficiently economical to enable a regular line of noble steamships to traverse this novel route, and so bring us within two months' distance of Australia. To quote a newspaper paragraph, 'Ever since Columbus set out across the Atlantic in search of India it has been the dream of commerce to reach the East by the West, and from the time that Balboa caught a glimpse of the great trans-American ocean from the heights of Darien, the world has looked forward to the junction of the two oceans at one point or another as the commencement of a new era in the history of commerce. Nevertheless, the Pacific has hitherto been a field of adventure rather than of regular commerce. Till recently it has been cut off from all direct communication with the trade and civilization of Europe and America. No maritime nations of importance have occupied any part of the extensive line of coast by which it is circumscribed, and within which it has lain in silent repose rather like a secluded lake than a mighty ocean. But a new destiny is beginning to dawn upon it. The 'Golden Age' breaks in upon its isolation, and arouses it from its slumbers. She inaugurates an era in which its commerce will probably as far transcend that of the Atlantic as the latter eclipsed that of the Mediterranean.'"

1854–56.—SIDE-PROPELLERS ON THE LAKES.—Side-screw propellers were advocated in 1856 as a substitute for the paddle-wheel. In 1854 the lake steamer "Baltic" was thus altered at Buffalo. Her high-pressure paddle-wheel engines were taken out and replaced with side-propeller engines. She carried double the weight and run with half the fuel at a higher rate of speed after the change, notwithstanding her new engines rated sixty per cent. less power than her old ones. The "Baltic" was the first vessel to which this mode of propulsion was applied.[2]

In 1848 Gardner Stow patented a screw propeller on each side of the vessel, so that the inclined vanes of sheet iron or wood should dip into the water.

1855.—The steam frigate "Mississippi" (paddle), flag-ship of Commodore M. O. Perry on the Japan expedition, sailed from Norfolk, Virginia, November 24, 1852, arrived at the navy-yard, Brooklyn, New York, April 23, 1855, and was the first war steamship of the United States navy to circumnavigate the globe. She went to Japan

[2] The Hudson River steamer "Iron Witch" had *side*-propellers in 1845. See *ante*, page 359.

via the Cape of Good Hope and returned *via* Cape Horn, or rather through the Straits of Magellan, having been absent two years and five months.

The "Mississippi" run aground in the attack upon Port Hudson in 1863, and was set fire to and abandoned to avoid her surrender.

April, 1856.—The steamer "Baltic" (Collins's Line) had bulkheads put into her hold in New York after making her last trip from Liverpool. These bulkheads should have been of iron instead of wood, which was cheaper. Why is it that water-tanks for vessels are made of iron, and the *fire-tanks*, or the encasement for boilers and engines, are made of wood, neither fire-proof nor water-proof? Iron bulkheads are lighter, less bulky, and cheaper, if the safety of life is taken into account.

1856.—STEAM VESSELS OF THE ROYAL NAVY.—On the 1st of April, 1856, the steam-vessels belonging to the Royal Navy were,—[3]

	Guns.	Horse-Power.
43 line of battle-ships	3797	22,940
24 frigates and mortar-vessels	889	10,560
90 paddle-wheel vessels	500	24,640
76 corvettes and sloops	761	16,202
47 troop-ships	37	7,300
155 gunboats	580	8,240
435	6564	89,882

In 1857 the American steamship "Vanderbilt" made the run from New York to "the Needles," the western extremity of the Isle of Wight, in nine days and eight hours, and on her return trip in nine days, nine hours, twenty-four minutes.

CHAPTER V.—1858–1882.

THE GREAT EASTERN, 1858; Description of the Vessel, etc.; Her First Voyage to New York and Arrival described.—The Emperor, a Steam Yacht, presented to the Japanese, 1859.—The Scotland and England purchased by the Prince of Satsuma, 1861.—The MONITOR, First Turreted Steam War-Vessel, 1861.—The Faid Rabani Yacht of the Khedive, 1863.—Number of British Inventions patented in the Ten Years preceding 1866.—Steamers on Lake Memphremagog, 1867.—The Kate Corser, the First Steamer on the Great Salt Lake, 1869.—An Extraordinary Inland Voyage, 1869.—Coal-Saving Discovery, 1872.—The Cable Steamer Faraday, 1873.—A Chinese Steamboat Enterprise, 1874.—The Bessemer Anti-Sea-Sick Steamboat, 1875.—The Double-Hulled Castalia, 1875.—The Iona, 1876.—Steamboats in Corea, 1878.—The Solano, 1879.—The Remarkable Voyage of a Wrecked Steamer, 1880.—The Comet on Lake Bigler, 1880.—A Mountain Steamer on Twin Lakes, 1880.—The Three Brothers transferred to the British Flag, 1880.—A Canal-Boat propelled by Air, 1880.—The

[3] Lardner's "Museum of Science."

Hochung, the First Chinese Steamer to cross the Pacific, 1880.—The Chinese Steamer Meefoo arrives at London with a Cargo of Tea, 1881.—Taggart's Screws, 1880.—The Anthracite, the Smallest Steamer that has crossed the Atlantic, 1880.—The Harriet Lane, 1881.—The Dessoug, 1881.—A Hydraulic Ship, 1881.—A Novel Steam Yacht, 1881.—The Kittatinny, 1881.—Steamboat Disaster, 1881.—The Fall River Line, 1882.—A West India Steamship Enterprise, 1882.—The Colossus, 1882.—RECENT NOVEL INVENTIONS AND EXPERIMENTS.—Morse's Unsinkable Ship.—Lundborg's Twin-Screws.—Root's Side-Screw Steamship.—Coppin's Triple Steamship.—Fryer's Buoyant Propeller.—Rosse's Catamaran Steam Tugs.

1858.—THE "GREAT EASTERN."—Experience had shown that a sea steamer of eighteen hundred tons, making the quickest passages to and from England and Australia, with a full cargo and complement of passengers, lost by the voyage from one thousand to ten thousand pounds. A great portion of the expense was from the necessity of supplying coal depots at different points where the steamer could touch during her voyage. These deviations from the shortest route also protracted the passage so that clipper-ships made as quick passages as steamers, at less expense, so that they superseded steamers. The problem then to be solved was: Supposing a steamer could be built to move eighteen miles an hour, what must be the size of a steamer to carry out and back fuel for a voyage from England to Australia,—twenty-five thousand miles? To work a steamer profitably, it was found that the tonnage must be nearly a ton to a mile. Mr. Brunel, therefore, conceived the idea of constructing a steamer of from twenty to twenty-five thousand tons burden, capable of carrying coal for full steaming on the longest voyage, to be built on the tubular plan, with both the screw and the paddle, and fitted also with sail for propelling power.

The Eastern Steam Navigation Company was formed to carry out his idea, with a capital of one million two hundred thousand pounds, in shares of twenty pounds each, with power to increase the capital to two million pounds. The place where the great ship was to be built, on the bank of the Thames at Millwall, consisting of a layer of mud thirty feet thick on a bed of gravel, was prepared by driving over fourteen hundred piles in lines parallel to the river, as the vessel was to be launched *sideways*. The first plate of the vessel was laid May 1, 1854.

The ship was built with an inner and an outer skin,—two feet ten inches apart, with longitudinal webs at intervals of six feet running the whole length of the vessel; and these were subdivided by transverse plates into water-tight spaces of about six feet square, so that should the outer skin be damaged the water could only get in between the webs and inner skin. The ship is divided by transverse bulkheads into twelve water-tight compartments below the lower deck, and nine above the lower deck, so that should both the outer and inner skin be

fractured the water could only enter one of these compartments,—two of which could be filled without danger to the safety of the vessel. Besides these transverse bulkheads, there are two which extend from the bottom of the ship to the upper deck, and run longitudinally for a length of three hundred and fifty feet. There are also two tubular iron platforms extending from the gunwale to the longitudinal bulkheads, running fore and aft, thirty-six feet apart, and connected together about every sixty feet by iron platforms seven feet wide. The greatest care was taken to make the bow strong enough to withstand any impediment, and to enable the vessel to resist the constant vibration of the screw.

The vessel has no keel, the bottom being flat. A keel-plate was first laid along a level platform prepared for it about five feet from the ground; then the centre-web, which somewhat resembles the keel of an ordinary ship.

The iron plates of which the skins of the vessel are composed are three-quarters of an inch thick, except the keel-plate, which is one inch thick. Their average size is about ten feet by two feet nine inches, and their weight eight hundred and twenty-five pounds. For the stern-post and keel some enormous plates were required. Two were twenty-seven feet long, three feet three inches wide, one and one-quarter inches thick, and weighed two tons each; others were twenty-five feet long, four feet wide, and one and one-quarter inches thick, and weighed two and one-quarter tons each. About thirty thousand plates, of an average weight of six hundred pounds each, were used in the construction of the hull. Each plate, before being placed in its proper position, was a separate study to the engineer. For each a model in wood was made, and by steam-shears the plates were cut according to the pattern; the proper curve was given to it, and the holes for the rivets were punched by machinery. They were riveted together by rivets, fastened at a white heat, some seven-eighths of an inch and some three-quarters of an inch in diameter, about two and a half inches apart where the plates were to be made water-tight, and from four to six inches apart in other places. The total number of rivets were not far from two million. About eight thousand tons of iron were used in her hull. The estimated weight of the whole vessel when voyaging with every article and person on board was twenty-five thousand tons.

For the purpose of launching the vessel two ways were constructed, with pile foundations, one at the fore part of the vessel and one at the after part, each three hundred feet long and one hundred and twenty feet wide, with about one hundred and twenty feet of space between them. The cradles, two in number, were of the same width as the ways. Their bottom was composed of iron plates seven inches wide and one inch thick, placed at intervals of one foot apart, with their

edges carefully rounded off so as to offer the least resistance to the railway metals of the ways down which they would pass.

The first attempt to launch the vessel was made November 3, 1857, and the vessel was moved six feet down in her ways. Several unsuccessful attempts were made on different days, until January 31, 1858, when she was afloat. The cost of building and launching the vessel in round numbers was seven hundred and thirty thousand pounds, exceeding the original estimate by two hundred and thirty thousand pounds. In November, 1858, the Eastern Steam Navigation Company, finding it impossible to go on, was dissolved, and a new corporation, called "The Great Ship Company," was formed, with a capital of three hundred and thirty thousand pounds. Of this capital one hundred and sixty thousand pounds was to be paid to share-holders of the former corporation; the fitting and finishing would cost about one hundred and twenty thousand pounds, so that it was estimated fifty thousand pounds would be left for working expenses.

The "Great Eastern" was christened by Miss Hope, now Duchess of Newcastle, daughter of the chairman of the Great Eastern Steam Navigation Company.[4]

SUMMARY OF STATISTICS OF THE "GREAT EASTERN."

Length of upper deck	692 feet.	Diameter of masts . .	2 ft. 9 in. to 3 " 6 "
Length between perpendiculars . . .	680 "	Quantity of canvas under full sail . .	6500 sq. yards.
Breadth across paddle-boxes	118 "	Number of anchors . .	10
Breadth of hull . . .	83 "	Number of boats . . .	20
Depth from deck to keel	58 "	Tonnage (old measurement)	22,500 tons.
Number of decks . . .	4	Storage for cargo . . .	6000 "
Number of masts . . .	6		

[4] W. S. Lindsay, in his "History of Merchant Shipping," says, in the summer of 1857, accompanied by Robert Stephenson and Brunel he visited the "Great Eastern." Preparations for her launching had commenced. After his inspecting the vessel, Brunel asked him what he thought of her. He replied, she was the strongest and best built ship he had ever seen and a marvelous piece of mechanism. "Oh," he said, rather testily and abruptly, "I did not want your opinion about her build. I should think I know rather more how an iron ship should be built than you do. *How will she pay?*"

"Ah," replied Mr. L., "that's quite a different matter."

Seeing Mr. L. did not care to answer his question, he repeated it, adding, "If she belonged to you, in what trade would you place her?"

"Turn her into a show," said Mr. L., with a laugh, "something attractive to the masses. She will never pay as a ship. Send her to Brighton, dig a hole in the beach, and bed her stern in it, and if well set she will make a substantial *pier*, and her decks a splendid promenade. Her hold would make magnificent salt-water baths, and her 'tween decks a grand hotel, with restaurant, smoking and dancing saloons, etc. She would be a marvelous attraction for the cockneys, who would flock to her by thousands. Candidly, this is my opinion, for I really don't know of any other trade at present in which she will be likely to pay so well."

Stephenson laughed, but Brunel was offended.

Capacity of coal-bunkers	12,000 tons.
Draught of water, unladen	15 ft. 6 in.
Draught of water, laden	30 feet.
Number of water-tight compartments	12

Paddle-Wheels.

Diameter of paddle-wheels	56 feet.
Weight of paddle-wheels	185 tons.
Length of floats	13 feet.
Width of "	3 "
Number of floats to each wheel	30
Length of paddle-shafts	38 feet.
Weight of "	30 tons.
Length of intermediate cranked shaft	21½ feet.
Weight of intermediate cranked shaft	31 tons.

Paddle-Engines.

Nominal horse-power	1000
Number of cylinders	4
Diameter of "	6 ft. 2 in.
Weight of cylinders, including piston and rod	38 tons.
Length of stroke	14 feet.
Strokes per minute	14

Paddle-Engine Boilers.

Number of boilers	4
Furnaces to each	10
Length of boilers	17 ft. 6 in.
Width of "	17 " 9 "
Height of "	13 " 9 "
Weight of each	50 tons.
Weight of water	40 "
Area of heating surface	4800 sq. feet.
Number of tubes	400
Thickness of plates	⅜ and $\frac{7}{16}$ in.

Screw Propeller.

Diameter of screw	24 feet.
Pitch of screw	37 "
Number of fans	4
Weight of screw	36 tons.
Length of propeller-shaft	160 feet.

Screw Engines.

Nominal horse-power	1600
Number of cylinders	4
Diameter of each cylinder	84 inches.
Length of stroke	4 feet.
Number of revolutions per minute	50

Screw Boilers.

Number of boilers	6
Funnels to each boiler	12
Length of boiler	18 ft. 6 in.
Width of "	17 " 6 in.
Height of "	14 feet.
Weight of "	57 tons.
Weight of water	45 "
Area of heating surface	5000 sq. feet.
Number of tubes	420
Thickness of plates	$\frac{7}{16}$ and ½ in.
Number of auxiliary engines	4
Number of donkey-engines	10
Total horse-power, about	12,000

Passenger Accommodation.

Number of passengers (first-class)	800
Number of passengers (second-class)	2000
Number of passengers (third-class)	1200
Aggregate length of saloons and berths	350 feet.
Number of saloons	10
Length of principal saloon	100 feet.
Width	36 "
Height	13 "
Length of berths	14 "
Width of "	7 to 8 ft.
Height of "	7 ft. 4 in.

Nothing can stand comparison with this great steamship except Noah's ark, and even Noah's ark could not match it. The length of the ark was three hundred cubits, its breadth fifty cubits, and its height thirty cubits. The Scripture "cubit," as stated by Sir Isaac Newton,

is twenty inches and about sixty-two hundredths. Bishop Wilkins makes it somewhat more,—namely, twenty-one inches and about sixty-eight hundredths. Reducing these to English feet, and calculating the tonnage after the old law, we have approximately the following table:

	Noah's Ark according to Sir Isaac Newton.	Noah's Ark according to Bishop Wilkins.	Great Eastern.
Length between perpendiculars . . .	515.62	547.00	680.00
Breadth	85.94	91.16	83.00
Depth	51.56	54.70	58.00
Keel or length for tonnage	464.08	492.31 . . .	630.02
Tonnage according to old law	18,232	21,762	28,093

So Noah's ark is quite overshadowed. Magnitude is not, however, the only peculiarity which the "Great Eastern" possesses. No other vessel afloat has two sets of engines and two propellers, nor was the cellular construction to be found elsewhere in marine architecture.

To comprehend the immense size of the ship one must go on the main deck. From that stand-point every foot of the deck is seen except the very shadow of the masts and chimneys. The wave of the hand can be seen by the steersman or any officer on watch on any part of the deck. Go on to the bridge between the paddle-boxes and look towards the bow, and you see a space in extent equal to the entire length of a very large steamer,—near two hundred and fifty feet,—and then turn your eye towards the stern and you have double the distance in that direction, the entire length of the deck being a little short of seven hundred feet and the width eighty-four feet. This expanse of deck covers about an acre of surface, or one hundred and sixty square rods, stretched out into a long oval one-eighth of a mile, or forty rods, in length. The deck of the ship is double, or cellular, after the plan of the Britannia tubular bridge, and is formed of two half-inch plates at the bottom and two half-inch plates at the top, between which are webs which run the whole length of the ship.

This deck is planned to be of such strength that were it taken up by its two extremities and the entire weight the vessel is to carry were hung upon its middle, it would sustain the whole unaided.

The deck is six hundred and ninety-two feet in length, or more than as long again as that of the steamship "Great Britain." It is nearly three times as long as that of the British line-of-battle ship the "Duke of Wellington"; eighty-eight feet more would make it as long again as the "Persia," the longest vessel, previous to the launch of the "Great Eastern," afloat upon the ocean.

"This ship," says a writer just after the launch, "is one of the wonders of this fast age, but whether, like some of the monstrosities of past ages, she is to be a mere curiosity and a monument of the folly of her builders, or whether she is to introduce a new age of progress in steam navigation yet remains to be demonstrated. The first step in

the solution of the problem is her safe and rapid passage from England to America."

"Granting, then," said the Liverpool *Albion*, just previous to her launch, "that the mammoth ship is merely an extended copy of all other iron steamers built on the wave-line principle, let us see what are the 'one or two exceptions,' so modestly alluded to by Mr. Russell last week before the British Association of Dublin. The most prominent in reality, though the feature which escapes unprofessional visitors, is the cellular construction of the upper deck and the lower part of the hull, up to the water-line, or about thirty feet from the bottom, which is as flat as the floor of the room. This system, while it gives greater buoyancy to the hull, increases her strength enormously, and thus enables her to resist almost any outward pressure. Two walls of iron, about sixty feet high, divide her longitudinally into three parts, —the inner containing the boilers, the engine-rooms, and the saloons, rising one above the other, and the lateral divisions the coal-bunkers; and above them the side-cabins and berths. The saloons are nearly sixty feet in length, the principal one nearly half the width of the vessel, and lighted by skylights from the upper deck. On either side are the cabins and berths, those of the first-class being commodious rooms large enough to contain every requirement of the most fastidious landsmen. The thickness of the lower deck will prevent any sound from the engine-rooms reaching the passengers, and the vibrations from being at all felt by them. Each side of the engine-rooms there is a tunnel through which the steam and water-pipes are carried, and also rails for economizing labor in conveyance of coal. The berths of the crew are forward, below the forecastle, which it is intended to appropriate to the officers.

"Below the berths of the seamen are two enormous cavities for cargo, of which five thousand tons can be carried, besides coal enough for the voyage to Australia, making about as many tons more.

"The weight of this huge ship being twelve thousand tons, and coal and cargo about eighteen thousand tons more, the motive-power to propel her twenty miles an hour must be proportionate. If the visitor walks aft and looks down a deep chasm near the stern, he will perceive an enormous metal shaft one hundred and sixty feet in length and weighing sixty tons; this extends from the engine-room nearest the stern to the extremity of the ship, and is destined to move the screw, the four fans of which are of proportionate weight and dimensions. If next he walks forward and looks over the side, he will see a paddle-wheel considerably larger than the circle at Astley's; and when he learns that this wheel and its fellow will be driven by four engines having a nominal power of one thousand horses, and the screw by a nominal power of sixteen hundred horses, he will have no difficulty in conceiving a voyage to America in seven, and Australia in thirty-five, days.

"The screw-engines, designed and manufactured by Messrs. J. Watt & Co., are the largest ever constructed, and when making fifty revolutions per minute will exert an effective force of not less than eight thousand horses. It is difficult to realize the work which this gigantic force would perform if applied to the ordinary operations of commerce: it would raise one hundred and thirty-two thousand gallons of water to the top of the London Monument in one minute, or drive the machinery of forty of the largest cotton-mills in Manchester, giving employment to from thirty to forty thousand operatives.

"There are four cylinders, each of about twenty-five tons, and eighty-four inches in diameter. The crank-shaft, to which the connecting-rods are applied, weighs about thirty tons. The boilers are six in number, having seventy-two furnaces, and an absorbent heating surface nearly equal in extent to an acre of ground. The total weight of the engines exceeds twelve hundred tons, yet they are so contrived that they can be set in motion or stopped by a single hand.

"Sails will not be much needed, for in careering over the Atlantic at twenty miles per hour, with a moderate wind, they would rather impede than aid; but in the event of a strong wind arising, going twenty-five miles per hour in the course of the vessel, sails may be used with advantage. The 'Great Eastern' is provided, accordingly, with seven masts, two square-rigged, the others carrying fore and aft sails only. The larger masts are iron tubes, the smaller of wood. The funnels, of which there will be five alternating with the masts, are constructed with double castings, and the space between the outer and inner casting will be filled with water, which will answer the double purpose of preventing the radiation of heat to the decks and economizing coal by causing the water to enter the boiler in a warm state. Her rigging will probably cause most disturbance of ideas to nautical observers, for, besides the unusual number of masts, she will want two most striking features of all other vessels,—namely, bowsprit and figure-head. Another peculiarity is the absence of a poop. The captain's apartment is placed amidships, immediately below the bridge, whence the electric telegraph will flash the commander's orders to the engineer below, helmsman at the wheel, and lookout man at the bows. In iron vessels, great precaution being necessary to prevent the compass being influenced by the mass of metal in such attractive proximity, various experiments have been made with the view of discovering the best mode of overcoming this. It was originally intended to locate the compass upon a stage forty feet high, but this plan has been abandoned, and a standard compass will be affixed to the mizzenmast at an elevation beyond the magnetic influence of the ship.

"Whatever misgivings there may be as to the length and the weight she will carry amidships will be set at rest before she touches the water by the mode of her launching, as great a novelty as the ship

herself. Hitherto the plan has been to build the vessel on an inclined plane at right angles with the water; but in the 'Great Eastern' this was impossible, on account of her great length, to say nothing of the expense of building a vessel of her dimensions in a position which would elevate her forecastle nearly a hundred feet above the ground. These considerations led Mr. Brunel to launch her *sideways*, with which view she has been built parallel with the river. In constructing the foundation of the floor upon which it stands provision has been made at two points to insure sufficient strength to bear the whole weight when completed. On these two points she will rest when ready, and thus her strength will be tested in the severest and therefore most satisfactory manner. Two cradles will be introduced at these points, and she will then be moved by two hydraulic engines. Timber ways are laid down to low-water mark, with an incline of one foot in twelve, and iron rails of peculiar construction are to be laid upon these transversely. A tell-tale will indicate the rate at which the two ends are descending, and any difference that may occur will be immediately rectified by strong check-tackles. It is calculated that she will advance twelve feet per minute, at which speed her submersion will be effected in twenty minutes. The cradles will then be drawn from under her, and she will be towed over to the opposite side of the river, where she will lie until ready for sea."

The London *Times*, after describing the ship, thus discourses,—

"With these principal figures gone through, let us imagine the 'Great Eastern' afloat and on her voyage to Bombay or Melbourne, with her ordinary complement of passengers on board. The first idea that strikes us is the multitude on board. It will, in fact, be a town afloat, and more than a town of four thousand population, because it will be a floating town of four thousand grown-up persons, with comparatively few exceptions, each of them being an 'individual,'—by which we mean a human being of size to command notice, and having, to appearance, a mind and will of his own, with a formed air, tone, and manner peculiar to himself. In this sense even young ladies are individuals. All this crowd of individuals will be collected within the dimensions of seven hundred feet by sixty. What a new shape of human society! Take the eight hundred first-class passengers by themselves, and what room does even this number afford for the formation of all kinds of different circles and sets, which will know nothing of each other, one man only knowing another by sight, and hardly that! How many immeasurable social charms will be collected within a few hundred feet! How many Mr. Smiths will there be who will not speak to Mr. Jones during the whole voyage because he is not in the same set! How many Mr. Joneses will pay back Mr. Smith in the same coin! Between how many 'nice' young ladies and 'proper' young gentlemen will there not be a great gulf fixed,

because in the eyes of anxious mothers the said young gentlemen are not desirable persons, but mere penniless bipeds! What flirtations will there not be behind boats, what rivalries, and, if many Americans voyage by the 'Great Eastern,' what duelings may we not expect on that ample deck! In short, what an epitome or camera obscura of the world will the 'Great Eastern' present! It will be worth any aspiring novelist's while to take his berth to Australia or India and back again simply for the great convenience of having so much human nature brought before him within so small a compass. It will be the mountain brought to Mahomet, the world condensing itself before his eyes for the sake of being observed and examined; the rapid succession of faces will bewilder him at first, but individuality will come out in time, though he must be sharp about his work, otherwise the 'Great Eastern' will have stopped her screw and paddles before he has got any results. If his material is enlarged his time is much curtailed on the new system. Farewell to long voyages with their appropriate quarrels and matches, their love-makings, reconciliations, and irrevocable unions; voyage-life has entered on another phase. For what is a month? It is gone before we begin to think about its going. How will the old voyagers look back to the romantic days when a roomful of persons were their own company for four months, gradually forming enemies or friendships, when attachments rose up among 'young people' unconsciously, and by the mere passive influence of the scene! We are growing a busier nation every year, and cannot afford time for more than one chapter of this sea romance."

After hopes deferred, and delays almost innumerable, the mammoth steamship "Great Eastern" made a highly successful trip across the Atlantic, and moored at the dock prepared for her in New York.

The event marks an era in the history of steam navigation. That a vessel so monstrous in its proportions—by the side of which the first steamer of Fulton would be but a cock-boat—should have been propelled across the ocean by the power of steam alone shows what strides have been made since 1818, when the "Savannah" first ventured to cross the Atlantic, steaming when the wind was not fair, and sailing with favoring gales.

The "Great Eastern" differs from all ships which have been built before it in three respects, the chief of which is her excessive magnitude. Nothing like it ever before floated. We have given the figures of her huge dimensions, but these naked numerals convey only a vague idea.

The steamships in the English and American navies hardly equal half her length or breadth, and yet the "Himalaya" the "Persia," the "Adriatic," and the "Niagara" were previously regarded as absolute prodigies in marine architecture.

The "Great Eastern" had thirty-eight passengers and eight guests

on her first voyage to the United States. There names were: Miss Herburt, Mr. and Mrs. Gooch, Mr. and Mrs. Stainthorp, General Watkins, Lieutenant-Colonel Harrison, Captain Morris, R.N., Captain McKennan, R.N., Major Balfour, Captain Drummond, Captain Carnagee,[5] R.N., Rev. Mr. Southey, Mr. A. Woods, correspondent London *Times;* Mr. J. S. Oakford, London agent Vanderbilt Line; Mr. Murphy, New York pilot; Mr. Russell, Zerah Colburn, Mr. Holly, correspondent New York *Times;* H. M. Wells, Mr. McKenzie, G. S. Roebuck, Mr. Skinner, D. Kinnedy, G. E. M. Taylor, G. D. Brooks, Mr. Taylor, T. Harnley, H. Marin, Mr. Cave, A. Zuravelloff, Mr. Merrifield, Mr. Field, Mr. Barber, R. Marson, G. Hawkins, H. Cangtan, W. T. Stimpson, Mr. Beresford, Mr. Hubbard, George Wilkes.

The following is the official report of the run of the "Great Eastern," on her first voyage to New York:

June 18,	latitude	49° 27′,	longitude	8° 45′;	run since yesterday,		285	miles.
" 19,	"	48° 41′,	"	16° 12′;	"	"	296	"
" 20,	"	47° 40′,	"	27° 54′;	"	"	276	"
" 21,	"	46° 16′,	"	30° 03′;	"	"	304	"
" 22,	"	44° 50′,	"	56° 22′;	"	"	280	"
" 23,	"	42° 50′,	"	42° 40′;	"	"	302	"
" 24,	"	41° 01′,	"	48° 52′;	"	"	299	"
" 25,	"	40° 58′,	"	56° 10′;	"	"	325	"
" 26,	"	40° 58′,	"	63° 41′;	"	"	333	"
" 27,	"	40° 13′,	"	68° 56′;	"	"	254	"
" 28,	"	40° 28′,	"	74° 00′;	"	"	234	"
Total							3188	"

The greatest speed attained during the passage was 14½ knots an hour, and she consumed 2877 tons of coal.

The New York *Herald* gave an account of the trip, from which we extract a few passages:

"THE START.—The 'Great Eastern' was advertised to sail on Saturday, the 16th of June. Workmen were engaged on her up to five o'clock in the afternoon of that day, and before they could be disembarked the weather, which had been stormy since noon, became thick and hazy, so that it was felt by the pilot it would be dangerous to take so large a vessel through the intricate channel of the Solent in the uncertain light of the evening. She lay, therefore, in Southampton water till Sunday morning, when about 7 A.M. orders were given to unshackle the mooring-chains. The ponderous character of these cables is such that it was forty-five minutes before this could be effected.

"The morning was raw and gusty, with the wind blowing down the water. The tide had canted the vessel athwart the channel, which she appeared to half block up, but on hoisting the fore-staysail she

[5] Captain Carnagee and Mr. Gooch were directors in the Great Ship Company, and Mr. Russell was a son of J. Scott Russell, architect of the ship.

slowly paid off and got her head pointed in the direction she was to go. Steam was admitted into the cylinders of the paddle-engines about ten minutes past eight, and shortly after the order was given, 'Easy ahead with the screw,' and the 'Great Eastern' steamed slowly out on her first voyage to sea. It has been a remark in all trials, that no motion is felt when this ship is under way. It was not until objects on shore began to recede that one could realize the fact of this huge ship being fairly on her journey. A few minutes steaming brought us abreast of Calshot Castle, where the colors were dipped in acknowledgment of a similar courtesy from the fort. With this exception our departure was ungreeted. The men on board the few vessels we saw had seen so much of the big ship that she excited no emotion in their minds, and we passed without a single cheer. The ship rounded the bell-buoy and ran into the Solent with the handiness of a yacht. As we passed Yarmouth our presence was acknowledged by the lowering of the ensign of the Yacht Club-House, a civility returned by the ship. In two hours we were abreast of the Needles. At twenty minutes past ten o'clock we discharged our Southampton pilot. In a few minutes we were again under way, with the screw making twenty-seven and the paddles seven and a half revolutions per minute, and ran down channel. The ship on starting drew twenty-two feet of water forward and twenty-six aft. Her right trim is on an even keel, so that her condition was unfavorable to her best performance. She had five thousand five hundred tons of coal in the bunkers. Being stored principally aft, this had something to do with her being down by the stern. The object of the trip was not to get any great amount of speed out of the ship, but to get the machinery and men in working order.

"The 'Great Eastern' so outrages all received notions of ship and of sea-life, that when strolling about one of her spacious unoccupied lower decks a party of English and American gentlemen are discovered in an odd corner engaged in a great international skittle-match, one accepts it as a matter of course, and is fully prepared to find a billiard-table in full blast in some other unexplored compartment of the vessel. It is certainly the first time skittles were played in crossing the Atlantic; but the idea is a good one, as enabling those fond of athletic sports to divert the tedium of a sea-passage by first-rate physical exercise. Several exciting foot-races have come off round our ample deck, and the distance to be run in making the complete circuit has been found quite sufficient to give the competitors a very decided 'breathing.'

"For those whose tastes do not lie in the direction of gymnastics there is a well-selected library of the English classics, which the accommodations of the saloons enable one to enjoy most luxuriously. Quite an interesting feature in our trip has been evening concerts in the ladies' saloons. Mr. Macfarlane, the conductor of the ship's band, and an able pianist, has added much to the general enjoyment by the excellent

manner in which the band has rendered a selection of musical duets for the piano-forte and the cornet-à-piston. Vocal amateurs among the officers and passengers have varied the performance, and Captain Hall has shown that to his other accomplishments must be added that of his being an excellent musician; his proficiency on the flute being very seldom equaled by amateurs.

"Thursday, June 28.—Ran under easy steam all night, and at twenty-five minutes past seven o'clock (ship's time) this morning reached the light-ship at Sandy-Hook, thus making the run, in spite of the long route taken, the loss of time by encountering the Gulf Stream, and the delay from fogs, in eleven days two hours, including the difference of time. The distance run by the ship was three thousand two hundred and forty-two miles; deducting the loss of time by the fog, this gives a speed of about thirteen knots, proving that with a clear bottom and full pressure of steam she would overrun Brunel's estimate of fourteen and a half knots an hour for a long run.

"The passage being, all things considered, decidedly fine, it was still sufficiently checkered to settle the important point of the 'Great Eastern' being the most comfortable passenger-ship in the world, her movements in a sea-way being so long, slight, and easy that no inconvenience is produced. Sea-sickness may be considered as annihilated, and the attendant discomfort of a sea-passage reduced to a minimum."

Mr. George Wilkes, editor of *Wilkes' Spirit of the Times*, a passenger on the "Great Eastern," has furnished a graphic account of his trip. The getting on board and the first day of the voyage he makes of but little account, but after a night on board he writes as follows:

"Monday, June 18.—I was awoke this morning by the sun shining brightly through my port-hole (I should rather use the plural, for my sumptuous apartment was lit by two), and I rose to enjoy the luxury of dressing in a carpeted space as large almost as a room in the St. Nicholas. Before I got up, however, I lay for a few minutes to observe the silence and quiet of the vessel. In fact, there seemed to be no motion to her at all, and had it not been for the barely perceptible buzz of her bow—to which I was very near—as it split the water and passed it humming along the vessel's beautiful wave-line, I should not have been able to decide with certainty whether she was going on or standing still. Vibration there was none, and as for the usual clatter of machinery, which is the distinguishing feature of a steamship, it could not be heard at all. Moreover, there was not any of the squeaking and squealing of timbers and tortured wood-work, which makes up a hideous serenade on all other vessels, for our party-walls, our state-room floors and ceilings, are of iron, and so ribbed and morticed, and joined stiffly with the hull, that the ship, while passing through still water, seems to be one solid tube or beam. Indeed, I could not make it certain to my senses that she had not stopped, until, looking out of my port-hole, I saw the ocean passing by, and our vast mass moving gradually through it like a floating castle. When I went on deck I found the air cool and bracing, but all there was of wind was caused by our own motion. At eight o'clock her paddle-engines gave ten revolutions, and those for the propeller twenty-nine, while the log, which was heaved a few minutes afterwards, credited her with a rate of ten knots. After timing the stroke of the engines I took a look at the rapidly-revolving paddles, and found that their original diameter of fifty-six feet,

which had proved to be too large, had been reduced to fifty feet by reefing or drawing in the floats, or paddles, three feet on each arm. A large projection of useless iron consequently extends beyond the actual wheels to make an unnecessary resistance to the water, and I am told that the wheel would do better still if the floats were reefed in yet farther.

"I now took my first promenade around the deck, and though well instructed in its vast proportions, I could not help wondering, as I went on, to see the space unroll before me as it did. Standing at the stern and looking forward, the vessel seems almost to terminate amidships, but when you reach that point there appears to open up another ship before you. This allusion proceeds from the fact that two large life-boats, which had hung outside towards the bow, had been brought in at the request of the Board of Trade, and set on blocks in the centre of the ship to divide the view. These, however, will be removed as soon as the vessel gets into port, and then there will be restored a clean, unobstructed double avenue, through which our friend Hiram Woodruff might drive a double team, and go only four times round to make a mile. The deck is flush from stem to stern, and its only obstructions are the six masts, the five smoke-funnels in between, the raised skylights for cabin ventilation, and seven low structures, all of which run in a line with the masts and smoke-stacks. The two outermost of these—stem and stern—are sheds for the donkey or auxiliary engines; two are erections for the main cabin entrances; one spacious one in the centre of the quarter-deck is allotted to the captain; another of like character is the double residence of the first and second officers, and another still, of tolerable size, is given to the passengers as a smoking-room. These are the only obstructions which are found on deck, while around them runs a clean twelve-foot promenade, one side of which has been named Broadway and the other Fifth Avenue. The floor of the deck, like the hull of the ship, is of iron, and built like the sides, on the tubular principle, with twenty-one inches of space between its walls, and interlaced and strapped, crossed and recrossed, with welded bars, so as to give it not only the buoyancy of a life-preserver, but almost incalculable strength. The facing of this floor is pine. Two men are usually placed at each of the wheels, so that eight are enabled to steer her; and four auxiliary wheels can be added, by which a force of thirty-two men can be brought to bear. Only four, however, are now guiding her through the calm, mild weather of the morning. The course is given by the first officer, the man next the compass guides the motions of the rest; and if the direction of the ship requires a sudden change, an auxiliary compass, or indicator, which receives its impulse from the central bridge, directs them immediately what to do. But for this device it would be difficult to guide the ship without great loss of time; but now orders are communicated from end to end with the speed of light, and the leviathan answers to her rudder and points its nose as readily as if drawn with a hook, or 'led' by its tongue with a cord.

"At noon, as the bugle summoned us to lunch, I timed the paddle-piston at ten revolutions and the propellor at thirty and a half, and the log at the same time reported twelve and a half knots. The run of the ship for the last twenty-six hours was reported as three hundred miles. Latitude 49° 27′, longitude 8° 45′. When we came up from lunch we found that a light breeze had set in upon our larboard quarter, and our jib and forward trysails were spread to take advantage of it. The wind freshened as the afternoon grew on, and at three o'clock the billows began to crispen at their tops and indicate a rising sea. At four o'clock a drizzling rain set in, and the still strengthening wind gave promise of a stormy night. Some of us had been apprehensive, from the mild manner in which we had set out, that the voyage might run through the entire length of its term in the same dull way, and thus, while it deprived us of the least possibility of becoming heroes, land us at New York without any further knowledge of the ship and her sea-going qualities than we could have learned by studying her while anchored in the Thames. The fear of such disappointment, however, was dispelled by the time we wiped our beards from dinner, for on ascending to the deck at six o'clock and taking our posi-

tion on the elevated grating in her bow, we saw the leviathan, before so dead, so apparently inert, and which had been passing through the waters like some spectral island, quicken with life and bend with a slow grandeur to the motion of the sea. 'Thank God, she rolls!' exclaimed an experienced officer on her first trial trip, when she was caught in a series of heavy billows off Portland Race, and it was with something like the same ebullition of delight that we saw the mighty ship cast her silent disposition off and make her obeisance to the still mightier deep. Her motion was a gentle and majestic swing from side to side, the extent of three or four degrees, and now and then when a billow fell away from her bow and a swell at the same time would roll underneath her stern she would mildly yield her head,—not short and sudden, with a plebeian start, but with a monarch's measured grace, as if she felt herself to be the master, and only yielding to the courteous laws of life. It was a great treat to see her thus leaning her way from side to side through the parting waters, while good-sized ships, which were then in sight, were rolling uneasily or pitching from stem to stern. It was like some accomplished swimmer, who sweeps forward gracefully hand over hand, compared to a clumsy novice who barely manages to keep himself afloat through the rapidity of a short digging motion. The 'Great Eastern' was alive; but mighty as she was, still she was amenable to that vast throb and pulsation of the sea which is mightier than the mightiest. Nevertheless she proved, by the comparison before us, her superiority to all ordinary ships, as well as to any disturbing motion. In fact, her soft undulations gave actual relief and pleasure to every one who stood upon her deck. And all the while this motion was upon her the skittles were played at one of the afterholds. Nevertheless, let it be noted here that the theory that ships above a certain size will march through the wave superior to the perturbation of the sea is ended by our experiment forever. No ship can be made large enough to entirely ignore the gigantic pulsation of the ocean. The foresail and fore-topsail were drawing well at dark, and the wind, which now struck us almost astern, was whistling through our cordage with great noise.

"A GALE.—Tuesday, January 19, I was awakened a little after midnight by the howling of the wind, the shouts of the men taking in sail, and a great tramping overhead. The vessel was rolling more than she had at any time before,—say about eight or nine degrees,—and I could now feel a little vibration of her bow, imparted by the screw as it smote and scudded into the water whenever the motion of the vessel lifted its blades above the surface. I went to my window, but the night was too thick for anything but darkness to be seen, and all I could distinctly hear was the measured wail of one hundred and twenty men (for both watches had been called up) in chorus, to 'haul the bowline, haul,' while engaged in trying to take in the mainsail and main-topsail. The wind seemed to soften a little at two o'clock, but perhaps that was the notion of my drowsiness, for I fell asleep at that hour, while the men were still as busily engaged at the mainsail as ever. I afterwards learned that it had employed them five hours to furl it in the furious tempest that prevailed. The cause of this difficulty was partly owing to the violence of the gale acting upon the immense area of the sail, and partly to the unhandy size of the tackle by which it must necessarily be worked. Everything is exaggerated in the way of size on board the 'Great Eastern,' and to be handled aloft as other ships she requires an extra breed of men. The gale subsided a little in its fury at four o'clock, but when I arose, at seven, I still found it blowing very hard, and the sea covered with a thread-like foam, which filled the hollows as well as whitened on the billow tops. Still the ship rolled only eight degrees, and her stately nod did not disturb a plate upon the table. The storm-rack was laid at breakfast to protect the dishes, but it was not needed, for my full tea-cup sat outside of it without being in the slightest peril of a slip. Nevertheless, a three-thousand-ton vessel would have been pitching sadly. The motion did not succeed in making a single person sea-sick, though there were among her passengers several who had never been to sea before.

"The wind moderated still more during the afternoon, and we set all our topsails, but the ship kept up her motion, and went frolicking along her path as full of life as a clipper-brig or a pilot-boat. Nothing could be more beautiful than to stand upon an elevated grating in her bow and see her stern lift itself majestically against the sky as we dropped into some yielding wave before us, or to behold her rising sideways to her equilibrium, like some frolicking beauty lifting her shoulder in her downy bed. I could hardly realize, as I viewed her buoyant step upon the deep, that ten thousand plates of iron, representing twelve thousand tons of inert metal, clamped by three million rivets, and bearing within, besides her ponderous engines, six thousand tons of coal, could career thus, cork-like, upon the bosom of the thin and shifting element below. Yet there she rode, ship-like and sweet, 'a thing of beauty and a joy forever.' The most striking idea of her size, however, and the greatest demand upon your wonder that she swims so lightly, is obtained by going down by her sponsons, outside and aft the paddle-boxes, which enables you to see her entire towering section abaft the wheel. From that point you face up and down her massive sides and see the black warehouse, for it looks not like a ship, grandly rise and fall in the hissing and downy foam which the wheels send flying by her run. This flying foam unites beneath her stern, and is there strewn into lace-work by the propeller, and goes seething on its broad path for miles. I think the scene from this lower platform of the gangway gives the finest idea, while in motion, of the vast power and grandeur of the ship. The deck and rigging, on the other hand, being seen altogether, lose in a little while their command upon the wonder, for their great symmetry so wins upon the eye that they mingle together in apparently usual degrees. It is only when in comparison with some other object that the 'Great Eastern' sensibly exhibits her huge proportions to an accustomed eye, and then everything else is dwarfed by her neighborhood.

"Wednesday, June 27.—Fine weather, with a breeze which kept four of our trysails set, continued during the afternoon, but at six o'clock a very heavy fog set in, which condensed itself upon the rigging in huge drops that fell upon the deck like rain. So dense did this all-pervading mist become that the lookouts could scarcely see ten feet from the ship, and our lights could not have been distinguished at the distance of a hundred yards ahead; so out of mercy to the unwary who might possibly be in our path, at near reach to shore, we slackened our speed down from fifteen to seven and a half knots, and ran at this rate, with frequent warnings from our whistle, all night. Under this state of affairs it was thought prudent, moreover, that we should make soundings to ascertain with certainty exactly where we were, but the effort failed at every attempt, in consequence of the great height we were above the water, requiring more line than we could pay out while the vessel was in motion. We slowed her down to six knots, then to four, and then to two, but still it would not answer, and the order went from the captain that the ship must be absolutely stopped.

"It had been the particular pride of Mr. McLenan, the chief engineer, who is a perfect enthusiast in his duty, that the ship's engines, which had been so much abused and misrepresented for the last year, should perform what scarcely, if ever, had been done before, and that was to make a first Atlantic voyage without a single moment's pause from port to port. When, therefore, he heard the order to stop the ship, he received it like a man who was smitten with a sentence, and asked with the greatest earnestness if we could not get along without. The answer was against him, and the lungs of the monster were folded from their respirations, and after ten minute's run with silent wheels and blades, and final reversal of her wheels, she sat still upon the waters. This event took place at 11.40, but a cast of one hundred and fifteen fathoms of line gave us no bottom, and we went on again, at twelve o'clock, still, however, continuing only at half speed. At ten minutes to five this morning we made another pause to heave the lead again, and this time with a cast of sixty-five fathoms we found bottom on George's Bank, and at ten minutes past five went on again. The fog having lifted, we now resumed our speed and pro-

ceeded at our usual rate of thirteen and fourteen knots. During these two pauses the engineer rapidly examined such of the screws and nuts as were not accessible during the action of the engines, but did not discover one that was out of place or that required tightening,—a great proof of the excellence and condition of her machinery.

"Thus ended the first transatlantic voyage of the 'Great Eastern,' and though it may be regarded as a failure in the way of speed, it will be perceived there were interests at stake which transcended that consideration, and which doubtless justified the commander in the unusual care he took to keep the great ship safe.

"Captain Vine Hall is one of the most experienced navigators of the English East India trade, but in addition to the caution which he naturally felt incumbent on him from the fact that he had never crossed the Atlantic before, he was doubtless deeply impressed with the paramount importance, not only to his employers and the cause of science, but to England and the whole world, of giving a substantial proof that ships of the size of the 'Great Eastern' could safely cross the deep. It was therefore properly a matter of secondary consequence to him whether the enthusiasm of his passengers or the ardor of his engineers or officers should chafe at his divergences or extra care; he accomplished the great point that was required, and we who left England with him but ten days before are here to approve his action. When he returns to England in September he will give the leviathan its head, and she will then prove for herself that speed is one of her attributes as well as safety. In fact, she has proved it already by the manner in which she has accomplished this voyage, and there is not a passenger who crossed in her but views her as beyond all comparison the most superior passenger-ship that ever floated. The extra distance which she ran on this trip is certainly equal to more than a day's travel, and when we add to this that twenty-four hour's margin is always allowed to a new ship's first voyage, and take into consideration also that not an officer on board ever made a voyage in her, that the men were all raw recruits, fresh levied within three days of starting, and that even the stokers did not know how to spread coal to advantage on the fires, we cannot help regarding even the time she made as a great triumph. As to her comfort and convenience as a passenger-ship, it is hardly possible to say too much in praise of her. She meets all the requirements of the most luxurious hotel, and when the weather drives her inhabitants below they can promenade through her cabins upon long walks, or lounge about upon superb divans, listening to music that would not discredit the most pretentious concert. By her continued steadiness sea-sickness is entirely ignored, and in the way of strength no iron structure that ever has been made can at all compare with her.

"This was impressed upon us by every sway of the sea, and the idea which she continually enforces on the mind, above all others, is her absolute safety from all ordinary dangers of the ocean. Against the risks resulting from contact with a solid body she is beyond all calculation stronger than anything which has been seen afloat. The manner in which her vast weight stood poised upon two single rests in the builder's yard for weeks before her launch, and the thundering against her sides of the huge battering-rams that smote her inch by inch towards the water, give evidence of what she can endure. No shoal or beach could break her before all her passengers could escape, for 'her scales are her pride, shut up together as with a close seal. They are joined one to another, they stick together that they cannot be sundered.'

"Above all other ships she should be chosen by the timid, and it really is a puzzle to me how so many intelligent men who had read the history of her construction, and who were about crossing to New York at the date of her departure, could be induced to choose any other vessel. She is certainly exempt from all the ordinary dangers of the sea, and any one who will go into her bow and look at the fourteen feet of matted iron in that welded beak will credit her with sufficient power and impulse to split and push aside any ordinary iceberg."

ARRIVAL AT NEW YORK.—The "Great Eastern" arrived at the bar at about seven o'clock on Thursday morning, and as it was known she would be detained until high water (two o'clock), ample time was afforded to everybody who wished to go down the bay to meet her, or to witness her approach to the city. Messrs. Grinnell, Minturn & Co., consignees of the ship, with their friends and the press, went down in a steamer and came up on board the "Great Eastern." The New York *Times* gives the following sketch of the passage of the bar and the trip up the bay:

"About two o'clock the order was given to cast off the steamer's tugs, which lay like two long-boats under her quarters, and Mr. Murphy, the pilot, with Captain Hall, mounted the starboard wheel-house, and the word was passed, 'Head slow with the paddles.' In another moment the enormous wheels were in motion, and the ship began to move. Slowly her great prow was turned off shore and headed towards the light-ship, for the purpose of getting a good entrance to the ship-channel. At 2.30 P.M. both the paddles and screw were in rapid motion, the ship heading towards Sandy Hook. The speed of the ship was now increased, so that the half-dozen steamboats which followed in her wake could with difficulty keep up with her. At three o'clock the ship was on the bar, when the paddles were slowed, as is the custom in passing that point with all vessels of heavy draught. She went over, however, without any difficulty, and the long-dreaded bar was safely passed. Full steam was now given to both the screw- and paddle-engines, and she made excellent time in coming up with and passing the Hook. Here the telegraph station was decked out with a profusion of flags, and as 'they had no guns to fire,' the fog-bell was vigorously tolled, a greeting to the passing steamer. This was replied to by cheers from the passengers gathered on the port side, in which Captain Hall joined; the ensign was also dipped. Meantime, an *extempore* lunch was prepared below for the newly-arrived guests, whom Captain Carnagee welcomed to the ship in a few words, to which Mr. Grinnell responded, giving as a sentiment the Press of New York, which was acknowleged briefly by Mr. Raymond and Mr. Erastus Brooks.

"Steering well to the southward to give ample room in which to turn the only remaining point of difficulty,—the Southwest Spit,—the order was given to slow the paddles to half speed; the helm was put hard a-port, and in less time than it takes to describe the operation she made the circuit of the spit with all the ease of a pilot-boat. No description could do justice to the scene of animation and enthusiasm which now surrounded the steamer as she approached the Narrows. Steamers of all sizes and descriptions swarmed about her, crowded with ladies and gentlemen cheering and waving their salutations.

"At a few minutes after 3 P.M. the 'Great Eastern' was dimly dis-

cerned in the foggy distance of the lower bay. Then she disappeared behind the bluff, and an hour passed before, over the walls of the new fort, at the distance of four miles, the tall masts of the great ship were seen rapidly passing. With an uncontrollable impulse a shout arose from the vast crowd on the old quarantine grounds and from Burr's Gardens. Opposite Fort Hamilton she stopped, and the fort gave her a rousing salute of cannon. When she resumed her 'onward march, her triumph o'er the deep,'—which at this point meant the bay of New York, that it was said she never could enter,—she in due courtesy replied in cannon. As she passed the various landings on the islands she was also greeted with gunpowder, and her health and the good wishes of the spectators were drunk, not in as much lager beer as would float her, but certainly in a great quantity of lager beer. As she passed the shore of the island she was admirable in her appearance. Though at a distance of more than a mile and a half, with the smoke of her cannon mantling about her and partially obscuring her magnificent proportions, she announced herself as the leviathan of the bay. By the rule of parallax, her size was indeed enormous, for she seemed to shut from observation miles of Long Island Heights over and below Greenwood and Gowanus. Her appearance as she passed up the bay took everybody by surprise. Not only was no voice of detraction heard, but all spectators were almost madly enthusiastic in her praise.

"The effort to round her to at the foot of Hammond Street was unsuccessful, it being necessary to moderate her speed so much that steerage-way was lost as soon as the engines were stopped. She accordingly swung with her head up-stream, and the efforts of two tugs, with hawsers at her bow, could not wind her. After drifting with the flood-tide, backing and going ahead for a long time, she was turned round, and at about eight o'clock P.M. was snugly got into her berth and made fast.

"There was no lack of admiration for the vast proportions, the graceful lines, and the internal arrangements and ornamentation of the ship. There was much surprise expressed at the neglected condition of the decks, which appeared as if they had neither been cleaned, scraped, holystoned, or varnished since she was launched. The planks in many places appeared badly shrunken, and suffering for want of wetting down. The same was observed of the platforms on both sides of the paddle-boxes, and other portions of wood-work of the ship. The smoke-pipes look as if they had encountered the storms of a voyage from India instead of England, and there is a general dirty appearance of the whole outside portion of the ship. It is understood that it will take several days to put her in condition to receive the visits of the public."[6]

[6] The Hon. John McLeod Murphy, once an officer of the United States navy, in a lecture on "American Ships and Ship-Builders," delivered at Clinton Hall, New York, December 29, 1859, took occasion to say,—

1858.—On the Emperor of Russia's birthday, September 21, 1857, the stern-post of the "General Admiral" was laid in Wm. H. Webb's ship-yard, New York, in the presence of the Russian Minister and many invited guests, the event being further celebrated by a prayer in the Russian language and a banquet at the Clarendon Hotel. A silver plate was placed in a mortice in the keel inscribed in Russian, "*The 70-gun ship "General Admiral" was begun in the presence of the Baron de Stoeckel, Russian Minister at Washington, September 21, 1857, at New York, after the plans of Wm. H. Webb, American ship-builder.*" The mortice was then closed, and the first copper bolt driven into the ship, every guest present giving a blow.

Precisely one year afterwards, on the birthday of the Grand Duke Constantine, after whom she was named, the "General Admiral" was launched with great *éclat*. Her cost was about $1,125,000. On her trip to Europe she made the voyage to Cherbourg in eleven days and ten hours, part of the time under canvas alone, with her propeller lifted clear of the water, her average speed being twelve knots an hour. In acknowledgment of her success the Emperor of Russia presented Mr. Webb with a gold snuff-box enriched with diamonds, and the British government immediately built two vessels after the

"I am not a prophet, nor the son of a prophet, but I hazard little in expressing the conviction that a monster ship, far exceeding the 'Great Eastern' in model and build, *will yet be launched in this country;* but her keel will not be laid until it is clearly demonstrated that she can be *made to pay.* Perhaps in the calm waters of the Pacific, when our trade shall have been fairly opened with Japan, the vessel that shall bring her enchanting fabrics and people will outstrip in magnitude and strength and speed the gigantic form of that which was conceived in the feverish brain of Brunel."

When they examined the hull of the "Great Eastern," in 1875, they found 52,000 square feet of iron plate incrusted with mussels, in some places to the thickness of six inches. The total weight of these incumbrances was estimated at 800 tons, enough to load two brigs or thirty freight cars.

The Manchester (England) *Examiner* reported in 1880 that the "Great Eastern" would be sold by auction soon, unless previously disposed of by private treaty. The step proposed was foreshadowed in the last report of the directors of the company, as will be gathered from the following paragraph: "During the past year several proposals for the employment of the ship have been made, but have fallen through from some cause or other; the directors are, however, using their best exertions to attain that object, which now becomes imperative, as the funds available for the maintenance of the ship are approaching exhaustion, and under these circumstances the directors feel it desirable to take powers from the shareholders to dispose of the ship in case no favorable proposal for chartering her should be received." The balance to the debt of profit and loss account at the close of the last year was eight thousand four hundred and thirty-one pounds. Considerable expenditure was made on the vessel last year, when she had new upper decks and part new masts. It may be stated that the capital of the company is one hundred thousand pounds, and that she stood in the books at the close of 1880 at eighty-six thousand seven hundred and fifteen pounds. She has been employed in various ways, but perhaps in none more successfully than the laying of the Atlantic cable. She is stated now to be in excellent condition.

same general design and model, which, however, never equaled her in speed.

She was 325 feet long, 55 feet wide, and 34 feet deep, and had two horizontal engines of 800 horse-power. A board of United States navy officers, consisting of Commodore (afterwards Rear-Admiral) A. H. Foote, Chief-Engineer W. E. Everett, and Naval Constructors S. M. Pook and B. F. Delano, reported to the Secretary of the Navy "that the workmanship and disposition of materials was excellent, and fully equal those of any vessel constructed by our government, and in regard to location of beams relatively to the parts she is superior, from the fact of the armament having been determined before building the vessel."

1858.—Thomas Rainey in his book entitled "Ocean Steam Navigation of the Ocean *Post*," says, "In offering to the government and public his volume he is conscious of his inability to present any new views, but there is no work in any country which treats of marine steam navigation in its commercial, political, economical, social, and diplomatic bearings, or discusses the theory and practice of navigation so as to develop the costs and difficulties attending high speed on the ocean or of the large expenses incurred in making regular and reliable statements."

1859.—STEAMING ON THE AMOOR.—Steam navigation was introduced upon the Amoor River, China, in 1859, by private means. The first steam vessel, called the "Admiral Kozawitch," was launched upon the waters of that river in the summer of that year. She was built in the United States, brought over in pieces, and put together at Nicolajefsk. She was constructed of timber, and had one paddle-wheel, and that astern. On her first trip she went up the river to the confluence of the Shika, and returned to Nicolajefsk. She then went up the river as far as the thriving town of Michael Semenofsky, at the mouth of the Soongari, and finally to Nianchoorsky, near Algoon, where she remained for the winter.

1858.—STEAMERS ON THE YANG-TSE-KIANG.—In 1858, it being questioned how far the Yang-tse-Kiang was navigable, a British squadron, composed of the "Retribution," Captain Barker, senior officer commanding; the "Furious," Captain Sherard Osborn (on board of which were Lord Elgin and staff); the "Cruiser," Commander Bythesea; the "Dove," gunboat, Commander Ward; and "Lee," gunboat, Lieutenant Jones, steamed up the river towards Hankow. The "Retribution" grounded and did not reach that port, but all the other vessels did, and were the first foreign vessels to penetrate so far into the interior of China, a service which Lord Elgin availed himself of to insist that Hankow should be opened to foreign commerce. The expedition left Shanghai November 9, 1858, and returned January 1, 1859.

1860.—In February, 1860, the Yang-tse was for the first time opened by treaty to the ships of other nations, and the "Scotland," commanded by Captain A. D. Dundas, R.N., and belonging to W. S. Lindsay,[1] an auxiliary screw steamship of eleven hundred tons gross register, was the first foreign merchant vessel which loaded a cargo from Shanghai to Hankow, bringing back teas for transshipment to Europe and America; but it was not until 1863 that any English vessel loaded a cargo direct from Hankow for Great Britain. The "Scotland" sailed from Shanghai with a full cargo for Hankow in June, 1860. She drew seventeen feet of water. Two light-draught trading steamers preceded her; one an American boat, and the other a Russian vessel from the Amoor. On the 8th of May, 1860, the auxiliary steamship "Robert Lowe," of twelve hundred and fifty tons, left Shanghai for Hankow for the purpose of loading a cargo of teas *direct* for London. Two other vessels, however, had preceded her. The engines of the "Robert Lowe" were only eighty nominal horse-power, and her passage between Shanghai and Hankow, a distance of six hundred and eight miles, occupied ten days. One day was lost in changing her propeller, which she had to anchor every night. The current averaged three knots, and at times was fully five knots an hour against her. The cargo of the "Robert Lowe," for Hankow and London, consisted of nine thousand five hundred and sixty-eight chests, two hundred and thirty-four half-chests, and two thousand and fifty-four boxes of black teas; five hundred and thirty-five bales of cotton and sundries; and her freights amounted to ten thousand three hundred and fifteen pounds, and four hundred and eighty pounds passage money.

Owing to the repudiation by the Chinese of the treaty of Tientsin, the defeat of the British forces at the Peiho and the subsequent war measures which resulted in a new treaty, the formal opening of the Chinese ports was deferred until the spring of 1861.

The first merchant steamer that anchored at Hankow after Lord Elgin's treaty was the "St. Theodosius," under a German flag; the second, the "Fire-Dart," an American side-wheel steamer belonging to Heard & Co.; the third was the British steamer "Governor-General," all within a few days of each other.

The "Fire-Dart's" imagined they were the first until they found the Germans had stolen a march upon them. Her trip was a most interesting one and had some of the excitement of an exploring expedition. They had no charts except some tracings obtained by Mr. John Heard from one of the officers of Lord Elgin's expedition. They touched at a great many places, and were absent from Shanghai from April 16 to May 14, 1861. The rebel forces occupied some two hundred and fifty miles of the river, and the "Fire-Dart" had several adventures with them.

[1] Author of "Merchant Shipping." See p. 467.

1863-64.—There were nine steamers loading between Hankow and Shanghai,—five British and four American,—some having a capacity for two thousand tons of tea, and all vessels of great speed, making the passage to Hankow in four days, and returning under favorable circumstances in less than half that time.

1873.—The "Hankow," and three other paddle-wheel steamers of a similar class, were built at Glasgow expressly for the navigation of the Yang-tse. The "Pekin," "Shanghai," and "Ichang" were finished in 1873, and the "Hankow" in April, 1874. Their dimensions were as follows:

Dimensions.	Pekin and Shanghai.	Ichang.	Hankow.
Gross tonnage	3076	1681	3168
Length on load water-line	292 feet	242 feet	308 feet
Breadth moulded	42 "	36 "	42 "
Depth	15 "	12½ "	16 "
Load Draught	10 "	9 "	11 "
Dead weight capacity	664 tons	460 tons	840 tons
Measurement capacity in tons of 40 feet	3668 "	1972 "	3800 "
Passenger accommodations, European	14 "	10 "	14 "
" " Chinese, 1st class	16 "	6 "	18 "
" " " 2d class	164 "	166 "	170 "
Speed on trial	13 knots	12 knots	12½ knots
Diameter of cylinder	68 inches	62 inches	72 inches
Stroke	12 feet	10 feet	14 feet
Indicated horse-power	1450	1200	1840
Pressure of steam	27 lbs.	33 lbs.	35 lbs.
Consumption of fuel at full power per hour	27 cwt.	27 cwt.	40 cwt.

Steamers of the above type in 1876 left Hankow and Shanghai daily, one dispatched by Russell & Co., an American company, the other by Butterfield & Swine, an English firm.

1877.—On the 15th of March, 1877, the United States steamer "Monocacy," Commander Joseph P. Fyffe, steamed from Hankow to Ichang, three hundred and fifty miles above Hankow and one thousand miles from the sea. April 5 the formal opening of Ichang took place, and the American flag was hoisted over the newly-established consulate, being the first foreign ensign raised thus far in the interior of China, and the "Monocacy" the first foreign vessel to reach Ichang.

The first steamer owned by the Chinese was the "Emperor," a yacht presented them by Lord Elgin on making his commercial treaty in 1858–59. Since then the Chinese have become owners of steamers with astonishing rapidity.

George H. Preble,
Rear-Admiral U.S.N.

(To be continued.)

AMONG OUR CONTEMPORARIES.

ABOUT the time of the naval manœuvres in England last summer, one of their service papers said, "Once more remarks are being freely passed as to the farcical nature of the pretense that the annual naval manœuvres are in any way a genuine test of the actual capability of the Admiralty to mobilize a large fleet at short notice. Months beforehand preparations more or less complete are made, whereas it is universally admitted that when next a naval war breaks out we shall not have many days', or even very possibly not many hours', previous warning."

This appears to be the opinion of Captain S. Eardley Wilmot, R.N., who has published a brochure, entitled "The Next Naval War," of which the *Army and Navy Gazette* says, "It is of a type with which we have now become very familiar, and if it help to stir public attention in the navy will serve a useful purpose. It certainly well repays perusal. War breaks out in relation to the non-evacuation of Egypt, and although the outbreak falls upon us like a bolt from the blue, the French are well prepared. At two o'clock in the afternoon their ambassador gives in his papers, and an hour later the fleet steams out of Toulon. Meanwhile, argument between the naval and military authorities in London leads to delay, for divergent views have to be reconciled. There is chaos at the War Office and the Admiralty. A raid of torpedo-boats upon Portsmouth results in the 'Inflexible' and 'Repulse' being torpedoed, and the same fate overtakes the 'Revenge' off Prawle Point, but she is floated into Portland. In the Mediterranean we are utterly defeated in a fleet engagement for lack of efficient force. It had been a question of numbers and not size of individual ships. It was the weight of metal discharged in a given time, not massive bolts at intervals, that was most effective. How defeat bears upon us, the reader should discover in Captain Eardley Wilmot's telling picture of naval warfare. The lesson is that we may suffer for unpreparedness and want of proper organization unless we take steps to fit ourselves for the struggle."

The action of the government in regard to Geronimo and his little band of Indians, who have been prisoners at large at Mount Vernon Barracks, Alabama, for several years, will be watched with great in-

terest by those who believe in the possibility of moral improvement in the case of our aborigines, as well as by a smaller class, who believe that the only good Indians are the dead ones. The climate of Alabama is said to be unfitted to these people, who, like all others of their race, seem to be particularly liable to pulmonary disease when they are obliged to live under a roof and in some conformity to civilized methods. The government has therefore determined, it is reported, to restore them to their native New Mexico, in installments, so to speak; that is to say, they are to be taken to Fort Sill, Oklahoma, kept there for a while, and then released in small numbers at a time.

A few years ago, Geronimo was the most dreaded of all the bad Indians of the Southwest. A murderous, ruthless old scoundrel, wily as a mountain fox, he was only captured after troops of cavalry had chased him for years and he had tortured and killed scores of innocent people. It was said at the time—but without truth—that some sort of promise that he should not be hung was conveyed to Geronimo before his surrender. How this could be we fail to see.

His captivity is a unique affair as regards the treatment of Indian culprits by the government, and it remains to be seen whether the lesson will be laid to heart by him.

Speaking of Indians, we may say that Mr. Price Collier, in his recent book, "Mr. Picket Pin and his Friends," tells some wholesome truths. Mr. Picket Pin is Lo! the poor Indian of the present day, and his present mode of life and the method of dealing with him, both by governmental and private agencies, is set forth in full. Among other rather severe strictures, Mr. Collier has the following: "From that time (1868) until now there have been a succession of treaties, reports, philanthropic sobs and sighs, and ill-directed humanitarian expostulations upon the subject of these Indians. They have been sent to schools off the reservations, and schools have been provided for them on the reservations, and they get consumption in the former and a little elementary learning and a certain innocuous and infantile facility in profanity in the latter. They have had the benefit of clergy in about all its sectarian forms, and some of these men and their wives endure great hardship and privation, and the sectarian schools work hard over them; but, owing to the absolutely artificial and effeminatizing arrangement by which they are freed from the necessity of earning a living, they are stationary morally, mentally, and spiritually, and falling off physically. The strongest of them, those who lead when there is any leading to be done, and who make public opinion among them, are untouched by the cobweb of the missionary or the leading-string of the school-master. The present day philanthropy is bad enough, and it is the curse of the population of our larger cities; but when contemporary philanthropy and contemporary politics join hands to succor a people, God help them!"

We take from the *United Service Gazette* some remarks upon experiments recently carried out by the Paris Society of Civil Engineers to test the visibility of colors, which experiments possess considerable interest from a military point of view. The distinctness with which colors could be perceived at long distances was assessed by numbers ranging from 1 to 8, the last number representing invisibility. It was found that, on a clear day and at a distance of six hundred and fifty yards, white stood out most distinctly, with the assessed value of 1; then came Hussar blue, madder red, and green. Gray and dead-leaf color were nearly invisible, and were therefore assessed as No. 7. The visibility of blue, gray, and brown was not altered in cloudy weather; but Hussar blue was slightly less visible, while madder red sank from No. 3 to No. 4. On the other hand, green became more visible in cloudy weather. Contrary to what might have been expected, the results of observations made at night were very nearly the same for all colors as when observed in cloudy weather, with one notable exception,—viz., that white, from being the most visible color, was no longer distinguishable.

La France Militaire, commenting upon the result of these experiments, points out that white is almost universally banished from army uniforms. Very dark blue forms the uniform of German infantry; iron-gray and dark blue are also the colors of the Italian army, so that the soldiers of both these armies may be said to be nearly invisible at long ranges, their degree of visibility, according to the scale mentioned above, being No. 6. The visibility of French infantry, with their red képis, dark-blue coats, and madder-red trousers, may be assessed roughly at 4½. The artillery and engineers in all these armies are practically dressed in the same way, in dark-colored uniforms. The most variety of coloring occurs in the cavalry. In Italy and Germany only the dragoons wear light blue. In France the whole of the cavalry wear madder-red breeches, and the light cavalry are dressed in light blue. As regards the color of its uniforms, therefore, the French army is somewhat at a disadvantage. In reality, however, the red trousers of the infantry are only visible between the top of the boots and the bottom of the long infantry coat, and after a few days spent in marching they become so discolored by mud and dust as to lose their distinctness at a distance. The French cavalry, whose special mission it is to spy out the movements of the enemy, without themselves being seen, however, labor under a real disadvantage, on account of the distinct visibility of their uniforms. No account has been taken of the conspicuousness imparted by the cuirass, helmet, and sword scabbard, as it is more than probable that in any future campaign care will be taken to brown any accoutrements which by their glitter are likely to attract the enemy's fire. The introduction of smokeless powder makes it more

necessary than ever that attention should be paid to uniforms being as little conspicuous in color as possible.

The *Army and Navy Gazette* some time ago printed the following remarks upon a book recently published in Paris, which has excited much attention, and which is entitled "L'Alsace devant l'Europe." The author, who calls himself "Patiens," says, "It is generally believed that on the battle-fields of the next war hecatombs of men will be slaughtered, and that, therefore, the war will be short." He prophesies that "a few hard fights will completely demoralize one of the contending parties and force it to ask for peace." The Berlin *Gegenwart* disagrees with "Patiens," and argues that it is easy to prove all these arguments wrong; that losses will be comparatively insignificant, and that the war will last till one or both of the contending parties is utterly exhausted. True, the advance of science in the art of killing men has been more rapid during the last quarter of a century than ever before since the invention of powder; but it would be absurd to believe that the number of victims in battle will grow in proportion to the march of science. Every perfection of arms is immediately met by a change of tactics which destroys the effect of the new inventions. Besides, we have not only advanced in the art of killing, but also in the art of healing. Arms are not the only thing to insure victory. The moral strength of the army is all-important. Not the number of men lost affects the army, but the way in which it bears its loss. It is to be expected that whole battalions will be mowed down, and that the troops stationed near them will be affected by a panic and fly without waiting to fire a shot, but such losses will be local and small in comparison to the number of troops employed. The war of the near future is undoubtedly a war between France and Germany. Other nations will take part in it, but they will be pretty evenly balanced, and the result will be as if Germany and France had fought alone. "The prediction that peace will come after the first few battles is founded upon the supposition that these battles will end favorably to one nation. Nothing warrants this supposition. The war will begin at once along the whole frontier from Nice to Dunkirk. France will have four or five armies, each of which will be as strong as her whole available force in 1870. Equal forces will oppose her. The arms and appliances, the tactics and preparations, are very much the same on both sides. In 1870 the loss of an army of three hundred thousand men crippled France seriously. If a like number were taken prisoners to-day it would still leave her three million soldiers to continue the struggle. Nor is Germany a whit less prepared. The two powers are possessed of a strength which has never been equaled, and it is impossible for them to expend this strength in a few days. It can matter little whether Germany or

France is the victor in the next war. The result will be the same. All the continental powers will ruin one another, and sink into a state of stupor and weakness similar to that of Spain and the lesser American republics. England and the United States will become the undisputed masters of the world without having fired a single shot, and Montesquieu's prophecy, 'Men-at-arms shall ruin Europe,' will then be fulfilled."

Apropos of this prediction as regards England and the United States, we may recall the fact that, within the last year or two, several propositions have been made looking towards alliance between the two countries. These propositions have almost invariably come from English sources, and the most carefully considered of all was contained in a paper in the *North American Review*, published last spring, and written by Sir George S. Clarke, K.C.M.G., a distinguished officer of the English army, stationed at Malta. His idea is for co-operation between England and the United States, instead of the union suggested by Mr. Carnegie. Sir George says that past and present national alliances have failed of the conditions necessary to permanence; but the United States and Great Britain alone of nations satisfy every requirement of a nation. Their instincts and aptitudes, derived from a common ancestry, are essentially commercial, and it is not by mere accident that, as regards sea-borne commerce, they stand at the head of the world today. After showing the enormous amount of commerce between the two countries, Sir George Clarke suggests that it is of supreme importance to both that the ocean routes of the world should be inviolable, and here he thinks is a basis for union which will endure. If the two countries should form a naval league and combine their fleets into one vast aggregation of sea-power, they could dictate at will peace throughout the sea highways of the world. No two nations have ever yet been fully organized in peace with a view to joint action. Their combinations have been fortuitous and unprepared, their operations enfeebled by jealousy and distrust. The Anglo-American league would exclude any such source of weakness.

"Scattered all over the world are British harbors, ready to become resting, coaling, and refitting stations for United States ships. The Navy Department and the Admiralty would be brought into close communication; the two intelligence departments would exchange information. The distribution of ships in given contingencies would be the subject of joint consideration. A free interchange of ideas as to construction and armament would prevail. Finally, the basis of the league would be essentially democratic, since the welfare of the masses is intimately bound up with the security of the sea-borne trade, even though neither democracy has yet fully grasped the fact.

"Thus the advantage would be mutual, indeed, would be increasing

to the American people, since it has become impossible for them to abstain from the responsibilities of a great nation. Such abstention is even incompatible with the effective maintenance of the Monroe doctrine. Samoa must have taught its lesson. If ultra-continental possessions have so far been eschewed, the time of their necessity must soon arrive.

"Whatever may be the temporary settlement of Hawaii, that important outpost of the North Pacific must become American soil, and Captain Mahan has clearly indicated another part of the world where annexation will soon be needed. With the Nicaragua Canal, which American enterprise will certainly complete, must open a new era of responsibility, as President Cleveland evidently recognizes, while South America reveals a vista too extensive to portray. If, therefore, the assumption by the United States of its rightful position among the nations is inevitable, no first step could be so wise, so safe, or so natural as a naval league of armed neutrality with Great Britain. No guarantee of peace on the seas could be comparatively effective. No other policy could open out to the American navy such a noble prospect of world-wide beneficence."

As to the settlement of questions arising between the two countries, Sir George Clarke suggests that an Anglo-American Council could effectively deal with most of them.

"Four members on either side, including the respective highest authorities, a president appointed for five years from each nation, alternately continuous renewal of members on the principle of the United States Senate, and complete dissociation from party politics, are the necessary conditions of a high tribunal which would command universal confidence. To such a body, meeting once a year, would be referred by joint consent, all questions not necessarily controversial, but of mutual arrangement; and the misunderstandings which the interchange of diplomatic notes inevitably promotes, together with the friction on the manufacture of which newspapers thrive, would cease. In the last resort arbitration would still be available. The substitution of personal conference for smart dispatch writing would mark an era in the relations of the two nations."

All of which is very fine on paper, but we fancy that both John Bull and Brother Jonathan will have to change their nature before any league of that kind would have a chance of temporary existence, much less of permanency.

Conceived in much the same spirit is the paper of that distinguished writer "Nauticus" in the *Fortnightly Review*. "Nauticus" is the person who so greatly stirred England some time ago by criticism of her naval preparations. He is supposed to be a foreigner, at least not an Englishman, but we believe that his identity has not been revealed.

He begins by deploring, in the interest of humanity at large, the blindness, ignorance, and indifference of England to the growing power of the United States, which, he says, render both countries far less powerful for good than they ought to be. "It divides and weakens the expression of the Anglo-Saxon will,—the will which ought, I am persuaded, to have upon the world in the future an even greater influence than it has had in the past." He considers the disposition of both England and the United States to keep aloof from the affairs of other nations as not a dignified position for either great English-speaking power.

"The dignified and the beneficent position would be one of controller of events. It would be worthy of Great Britain and the United States, and well for all other countries, if you were able to say to Europe, as it stands now armed to the teeth, 'Only by our leave shall you fight; and if you fight, only with our permission shall the victor keep his spoils.' And because the Anglo-Saxon might do this and much more, it is sad to see Great Britain and the United States wasting their opportunities and imperiling their mission by trying to cultivate the fiction that they have different objects in life and need not closely associate one with the other.

"It is in the utilization of sea-power in its various aspects that the two countries may best co-operate and assist one another in the future. If they were to come, as they surely will come, to an understanding to employ their combined naval forces for the preservation of general peace and for the forwarding of common interests, few countries, no matter how belligerently inclined, would care to defy the alliance even now; and none would dare to question its will after it had rearranged its forces in frank recognition of all its responsibilities. It is not merely that the combined navies would be strong. Far more weighty are the considerations that the British empire and the United States share between them nearly all the work of providing other countries with the food, raw material, and manufactures which those countries cannot provide at home, and of carrying the ocean-borne trade of the world. The interests of your ever-growing commerce require the maintenance, if not of peace, at least of open ports everywhere. Why should not your combined navies declare, 'We refuse henceforth to acknowledge the right of any civilized power to close her ports, or the ports of another power, by blockade or otherwise?'" Surely, that would sound the knell of war!

"Nauticus" believes that the world can afford to place its confidence in the integrity and fairness of the Anglo-Saxon race, and that if that race were all-powerful, no other race would be oppressed; and he thinks that, for the sake of peace and disarmament, it seems necessary that some superior power should be created, and that this would be the power least likely to abuse its position. "I think," says the

writer, "that the happy future of Great Britain, of the United States, and of the outlying British empire depends upon the realization of such a dream. I think that the accomplishment of the Anglo-Saxon mission in the world depends upon it. I think that civilization and peace would profit by it."

During the late war between Lobengula and the South African colonies, the former, becoming alarmed at the manner in which his enemies were pressing him, sent a message of submission by two troopers of the Bechuanaland police,—Daniels and Wilson by name. These men were also intrusted with a present or tribute of one thousand pounds from Lobengula, as a pledge of his desire to make peace. The two scoundrels agreed to suppress the message and to divide the money between them, and in consequence of their action a deplorable massacre of a body of Englishmen occurred, the natives being driven to desperation.

Some time after the event the facts came out, and the culprits were arrested and the money recovered. They were then tried, convicted, and sentenced to fourteen years' penal servitude, while the proceeds of the theft were ordered to be confiscated.

It would seem to the ordinary mind that, if ever men deserved hanging, these two did.

Lee Meriwether, the author of "Europe on Fifty Cents a Day," in his last book of travels in the Mediterranean countries, says, in speaking of the Italian prison system, that the proportion of prisoners in the thousand is nine, and in the Abruzzi it is sixteen and seven-tenths per thousand. "The cost of supporting this army of felons is enormous. In 1881, the last year for which I was able to obtain figures, the expenses to the Italian people for prisons was 10,694,643.64 lires ($2,031,982.29). Only a small part of this expense is paid for by labor of the convicts, their time, when not idle, being largely devoted to government work, such as building fortifications, printing official reports, etc. Italian judges lean towards long sentences. Of 17,729 men condemned to the galleys, only 5 had sentences less than five years, 2110 were sentenced for ten years, 4352 for fifteen years, 4745 for twenty years, 1839 for more than twenty years, and 4678 for life. A fact of special interest to Americans is that relating to the movement of freed convicts. The charge has been made that convicts receive government assistance to emigrate to the United States, and there is reason to believe the charge true of some European states; the director of a German prison told me that the English language is no longer taught in the convict schools. I asked why.

"'Because,' replied the director, 'it is difficult now to send our

convicts to the United States; your laws are too strict. We are having the prisoners taught Spanish, so they can be sent to South America.'

"If reliance can be placed upon the official report of the Italian prison director, America has nothing to fear from Italian convicts, as, after liberation, ninety-seven per cent. return to their original homes, two per cent. seek new homes in Italy, while only one per cent. leave the kingdom."

Among Marshal Peixoto's plans for Brazilian improvement are those for the reorganization of the military and naval services. These plans include a fusion of the military and naval schools, where candidates for commissions in either service will, in the main, follow the same preliminary courses. These will be mathematics, astronomy, physics, chemistry, biology, sociology, etc., after which are to come the special studies.

In recommending the replacement of naval vessels and material rendered necessary by the losses caused by the revolt, he recommends that the *personnel* should be equipped as nearly like the army as possible. "The rebellion clearly showed us," the marshal goes on to say, "that we were not, and are not now, prepared to resist attacks from either foreign or domestic foes."

Works looking towards a better state of preparation are at once to be begun, not only at the ports, but on the frontier, and for this purpose an extraordinary credit of three thousand contos of reis has been opened. The Minister of War is already at work upon rearming the three arms of the military service, for which purpose there has been appropriated fifteen thousand contos of reis, or about seven million five hundred thousand dollars.

The *Vanguardia*, referring to the exaggerated statements of certain Mexican journals as to the military and naval force of that country, gives the following *résumé* of the present state: 12 generals of division, 65 generals of brigade, 1130 superior officers, 2063 subaltern officers, 21,643 soldiers and marines, 6245 horses, and 2065 mules. The medical corps consists of a surgeon-general, 63 superior officers, 46 subaltern officers, 231 hospital corps men, 4 horses, and 27 mules. The navy has 107 officers, of whom 16 are of superior rank, and 507 seamen and marines. The vessels are two screw dispatch-boats, two gunboats, and a school-ship. Four gunboats, five torpedo-boats, and two transports are in course of construction, and it is intended that an armored vessel and a cruiser shall soon be in hand.

E. SHIPPEN.

NAVAL AND MILITARY NOTES.

NOTES AND DATA ON NAVAL AND MILITARY MATÉRIEL AND ALLIED SUBJECTS.

It is the intention to collect and publish in this department of the "United Service" all information obtainable from current publications and other available sources concerning ships, guns, armor, explosives, small-arms, military and maritime affairs, and kindred subjects. As the data are derived largely from unofficial sources, strict accuracy cannot be expected; but all reports will be carefully examined and compared with others on the same subject, and it is hoped, by this means, to attain fairly correct results. Erratum notices will be published whenever errors are discovered in data previously given. As the development of the present plans for collecting information progresses, it is hoped to secure fuller and more authentic reports.

ABBREVIATIONS USED IN THE NOTES.

b.l. = *breech-loading guns of ordinary (not rapid-fire) type.*
cm. = *centimetre.*
f.a.m.l. = *fore and aft midship line.*
I.H.P. = *indicated horse-power.*
l.w.l. = *load water-line.*
m.g. = *machine gun.*
mm. = *millimetre.*
pr. = *pounder (as 6-pr.).*
r.c. = *revolving cannon.*
r.f. = *rapid-fire.*
r.f.g. = *rapid-fire gun.*

WAR-SHIPS AND TORPEDO-BOATS.

France.

"FORBAN."—The dimensions of the sea-going torpedo-boat *Forban*, now under construction at Normand's yard, Havre, are as follows: Length, 144 feet 3 inches; beam, 15 feet 3 inches; draught 10 feet; displacement 130 tons. The anticipated I. H. P. of the engines is 3200, and the corresponding expected speed is 30 knots. If this speed is attained she will be the fastest craft afloat. Twin-screw engines are fitted, and the armament consists of two torpedo-ejectors and two 1-pounder rapid-fire guns.

TORPEDO-BOATS: SPEED, LAUNCHES.—The greater number of the 36-metre torpedo-boats launched last year have completed their trials successfully. Nos. 171, 145, and 146, built by Normand, as well as many others constructed by him and by other builders, have exceeded 24 knots. No. 171 made 24.38 knots during a three-hour run. The *Archer*, 21 knots, and the *Chevalier*, 27.2 knots, have been accepted and taken into service. The cause of the low speed of the *Archer* is that she was specially constructed to use the boilers and machinery of the *Avant-Garde*,—a very doubtful sort of economy. The new torpedo-boats building by Normand are all fitted with Du Temple boilers with modifications in the size of the tubes made by Normand,—the upper tubes being made larger than the lower ones. The *Dauphin* (43-metre type) was launched at Havre on March 23.

BATTERIES OF SHIPS CHANGED.—The replacing of the ordinary artillery by rapid-fire guns on the principal vessels of the Mediterranean fleet is almost finished, and these alterations will be commenced on the vessels of the second division immediately after the general inspection in the autumn.

"CROCODILE," "FRANCIS-GARNIER."—The Minister of Marine has removed from the effective list the gunboat *Crocodile* (466 tons, composite built) and the river gunboat *Francis-Garnier* (200 tons, iron).

"DUQUESNE": REFIT.—The *Duquesne*, a sister ship to the *Tourville*, has undergone a similar refit. The new battery consists of seven 16-centimetre rapid-fire guns, model 1884, of which one is mounted in chase under the forecastle, and fourteen 14-centimetre rapid-fire guns, seven each side, of the same model. A rapid-fire 3-pounder has been placed at each end of the bridge, and others in the tops and elsewhere. New boilers have been placed on board and the engines thoroughly overhauled.

"CALEDONIEN": REFIT.—As soon as the alterations which are being made to the *Caledonien* at La Pallice are completed, this vessel will receive her new battery and be commissioned as an annex to the Artillery School training-ship. As much of the material on board the *Cacique* (ex-*St. Louis*) as is suitable for use on the *Caledonien* will be sent from Toulon. When completed for service the *Caledonien* will have her steam trials at Rochefort.

"SUCHET": SPEED TRIAL.—In her recent trials the *Suchet* developed a mean speed of 20.4 knots.

"MAGENTA": CONCLUSIONS OF COMMISSION.—The special commission appointed by the French Chamber to examine the *Magenta* were taken out from Toulon on board that vessel. The maximum speed attained during the trial was 15.6 knots. There were no accidents. It appears that though the stability of the *Magenta* is no longer contested by the delegates, some of them are of the opinion that she has some very serious defects. M. de Kerjegu, a member of the commission, stated to a correspondent of the *Figaro* that the stability of the *Magenta* is quite satisfactory; but when she heels over 14 degrees, as she did in smooth water when running at high speeds with full helm, the lower edge of the armor-belt is exposed, and the water-gauges of the boilers are so much displaced that there is danger of the upper tubes being burnt and of accidents occurring.

Russia.

"RUSSIA": PARTIAL DESCRIPTION.—The amored cruiser *Russia*, building at the Baltic Yard, St. Petersburg, is of the following dimensions: Length, 480 feet; beam, 68 feet 6 inches; draught, 25 feet; displacement, 12,180 tons. The main engines are twin-screw, triple expansion, of 15,000 I. H. P. with forced draft, and 10,000 I. H. P. with natural draft. The anticipated maximum speed is 19.5 to 20 knots, which is hardly likely to be realized if the horse-power of the engines is correctly reported. The *Russia* is said to be fitted with an armored (protective?) deck extending from stem to stern. No mention is made of an armor-belt in the descriptions so far published. If the Russian admiralty has abandoned the light belt hitherto fitted to all their armored cruisers, it will be a new departure. The principal armament consists of 34 guns, and the secondary battery, of 18 rapid-fire guns. Six torpedo-tubes are fitted.

"SESTORESK": DIMENSIONS, ETC.—One of Normand's most recent torpedo-boats is a small first-class boat for the Russian navy, completed last winter, and called the *Sestoresk*. The dimensions are: Length, 118 feet; beam, 13 feet 2 inches; draught 8 feet 8 inches; displacement, 75 tons. The designed horse-power of the twin-screw engines is 1800, and the expected speed is 24 knots. Two torpedo-tubes are fitted, and the armament consists of two 1-pounder rapid-fire guns. The complement is 21, and the coal capacity is 10 tons.

Germany.

"KAISERIN AUGUSTA": TRIAL, REMARKS, DIMENSIONS.—The triple-screw, protected cruiser *Kaiserin Augusta* had her speed trial on September 29, 1892, but the details did not become public for some time afterwards. The German papers claimed that she made 22 knots,

and this speed is mentioned as "reported" in the NOTES for April, 1893, accompanied by a comment by the editor that, "If this speed was actually reached, the estimated horse-power (12,000) must have been considerably exceeded, or three screws are much more efficient than two." The correctness of this opinion is shown by the following, for which we are indebted to the *Journal of the American Society of Naval Engineers*. The displacement on trial was 6000 tons, instead of 6500 tons, which is her proper load-displacement. The mean results of the trial were: I. H. P., 12,616; speed, 20.86 knots. At her mean load-displacement her maximum speed is therefore probably not over 19.75 knots. According to the authority above quoted, the dimensions of the *Augusta* are: Length, 388 feet; beam, 51 feet 2 inches; draught 21 feet 7 inches; load-displacement, 6500 tons. The *Almanach für die K. und K. Kriegs-Marine* gives the dimensions as: Length, 387 feet 2 inches; beam, 49 feet 3 inches; draught, 23 feet. Brassey gives slightly different dimensions still, but it is believed that the first ones given are most nearly correct. The engines are triple-expansion, with cylinders 33.47, 65.15, and 86.61 inches in diameter by 37.4 inches stroke. There are eight double-ended boilers and one single-ended boiler; total grate-surface 1100 square feet, heating-surface, 33,000 square feet. The screws are all of the same diameter, 14 feet 9 inches, and have their axes in the same horizontal plane; the pitch of the outer screws is 22 feet 4 inches, of the centre one, 21 feet 4 inches. The axes of the outer screws are about 26 feet apart, and they are 18 feet forward of the centre screw. Before the vessel was tried it had been anticipated that the centre screw would revolve more rapidly than the side screws, but instead, it made five or six revolutions less. In the *Columbia* the centre screw is smaller than the others and had the same pitch, yet it also made about six revolutions less than the side screws. The battery of the *Augusta* consists of twelve 15-centimetre (5.9-inch) and eight 8.7-centimetre (3.4-inch) guns and several smaller pieces.

Austria.

"TEGETTHOFF": REFIT.—The armored battle-ship *Tegetthoff* (7890 tons), of the central battery type, has undergone a most extensive refit and re-armament. So far as reported the general features of the hull and armor remain unchanged. The old single-screw engines were entirely removed, and replaced by triple-expansion, twin-screw engines, of about 8000 I. H. P. Upon trial the new machinery gave a speed of 15.2 knots with 7340 I. H. P. With the full 8000 I. H. P. 16 knots is expected. The maximum speed with the old machinery was 14.37 knots. The new boilers are designed for a pressure of about 145 pounds per square inch. The engines were built by Schichau. All sail-power has been done away with. The original masts are replaced by two military masts each carrying two tops. The new battery consists of six 24-centimetre (9.45-inch) Krupp guns in the central battery; five 15-centimetre (5.9-inch), 35-calibre Krupp rapid-fire guns; two 7-centimetre (2.75-inch) Uchatius bronze guns; nine 3-pounder rapid-fire guns of 44 calibres and six of 33 calibres; and two machine-guns of 8 millimetres (0.315-inch) calibre.

SMALL-ARMS AND EQUIPMENTS.

MAGAZINE PISTOLS.—Several inventors are reported to be struggling with the problem of magazine pistols. The advantages of such an arm are great and obvious. So long as the powder-chamber (*i.e.*, the cylinder) and the barrel are separate the revolver cannot lay claim to the title of an arm of precision or high power. The break in the arm where cylinder and barrel meet, or are supposed to meet, permits a considerable escape of gas with a resulting loss of pressure and consequent reduction of velocity. Any attempt to increase the velocity by the use of longer and more powerful ammunition adds unduly to the length and weight of the arm without equivalent gain, for the higher and longer sustained the powder pressure the greater the escape of gas. Moreover, the present ammunition gives quite recoil enough. The defects of the revolver seem inseparable

from the fundamental principles of its construction, and it is a recognition of this fact that has led to the present investigations of the possibilities of magazine pistols. Present indications seem to point to the following characteristic, which it is desirable for the arm to possess: A calibre of about .32 (say 8 millimetres); a lead bullet with nickel, steel, or copper envelope; a length of barrel, measured from the base of the bullet, of about 25 calibres; a bottle-shaped cartridge with unusually large, but short, powder space, to reduce the length of the cartridge as much as possible, and charged with quick-burning powder; the energy of recoil to be utilized to extract, load, and cock the firing-pin or device: this will admit of a light pull, say not over four pounds; a cocking device for single-shot firing; a detachable magazine to hold four to eight cartridges; a simple, efficient safety-catch, convenient to the touch, but protected against possible disturbance while drawing the pistol or returning it to the holster or frog, or while being carried in one or the other; a smooth exterior, as free of projections as possible; a strong, powerful grip; lastly, as great simplicity of strength of parts as is consistent with proper lightness and other qualities. What desirable qualities may be sacrificed to secure absolute efficiency only experience in service can decide. It is too often forgotten that arms must be suited to those who are to use them, and many desirable features must often be omitted, or their presence may make the weapon almost valueless for its designed use.

BAYONET SCABBARDS OF ALUMINUM.—Among the accoutrements which the Ordnance Department of the United States army expects to make of aluminum is the bayonet scabbard. Samples are being made, and, if satisfactory, the present production of steel scabbards will cease.

THE "NEW LEE" RIFLE.—The "new Lee" rifle is an object of considerable interest abroad. *Arms and Explosives* reports that its parts are fewer and simpler (than any other?); the magazine can be filled by means of a clip containing ten cartridges on the principle of continental weapons; it can be fired rapidly without removal from the shoulder, owing to the bolt being worked by forward and backward motion (*i.e.*, straight pull) simply. The bolt is automatically locked when the last shot has been fired.—*Army and Navy Journal.*

CARBINE FOR SWISS CAVALRY.—The Federal Council of Switzerland has decided to adopt for the cavalry a carbine of the Mannlicher type. The calibre will be the same as the 1889 model. The weight is not to exceed three kilogrammes. The length will be 1020 millimetres; that of the barrel 550 millimetres.—*Army and Navy Journal.*

TORPEDOES, TORPEDO-NETS, AND TORPEDO-GUNS.

TORPEDOES, TORPEDO-TUBES, AND TORPEDO-NETS; THEIR VALUE AND LIMITATIONS.—In an article on "Torpedoes" in the *Journal of the Royal United Service Institution*, Mr. T. J. Haddy, staff-engineer in charge of the torpedo-store at Portsmouth, thus summarizes his conclusions, based upon his own observation and the opinions of torpedo-experts in the various European navies: "That torpedo-net defenses are impracticable and useless as fitted on board modern ships, being only dangerous encumbrances and forming no efficient defense against torpedoes now in use. That torpedo-tubes above water, if unprotected, would almost certainly be put out of action in a short time by modern quick-firing guns at short ranges. That protected ships carrying heavy artillery would hardly dare to approach each other within launching distance until the artillery fire of one or both of them had been greatly weakened. That a fixed tube on the beam, whether above water or submerged, is, from a tactical point of view, the least likely to be required in action, and that all broadside tubes should be capable of some degree of training. That the effect of the introduction of quick-firing guns of large calibre is to limit the employment of torpedoes to small ships and

boats of very high speed, specially adapted for swift, sudden, and secret attack." In commenting upon the above, the *Army and Navy Gazette* says, "It follows, however, that the threat of torpedoes being employed from battle-ships may preserve them, after their artillery fire has been weakened, from the ram, while it is to be noted that the employment of torpedoes on small craft must be limited to hours of darkness as the only time suitable for 'swift, sudden, and secret attack.'"

It seems doubtful if the above sweeping condemnation of nets is sustained by the facts. Beyond question their value is much less than at one time supposed. But there must be times when it would be highly desirable for a battle-ship to anchor or lie-to within range of a possible torpedo attack; and under such circumstances, nets which can be easily and quickly put out and taken in would be of great value.

The French recently conducted some experiments with the Patrick torpedo at Brest, but a description of their character and of the results and conclusions has not yet been published.

Comparative Specifications for Whitehead and Howell Torpedoes.

DIMENSIONS.[1]

	Whitehead.	Howell.
Length	141¾ inches.	180 inches.
Diameter	17½ inches.	14.2 inches.
Weight complete for trial	829 pounds.	492 pounds.
Explosive charge	110 pounds.	96 pounds.
Proportion of charge to weight	13.5 per cent.	19.5 per cent.

TESTS.

	Whitehead.	Howell.
Speed for 400 yards	30 knots.	22½ knots.
Speed for 800 yards	26½ knots.	. . . . .
Deviation allowed at 400 yards	8 yards.	15 yards.
Deviation allowed at 800 yards	24 yards.	. . . . .
Allowed variation in depth as shown by nets at 400 and 800 yards	15 inches.	. . . . .
Allowed variation in depth after 95 yards run during entire run	. . . . .	24 inches.
Height of tube above water	4 feet.	4 feet & 11 feet.
Initial dive allowed when launched from height of 4 feet	. . . . .	22 feet.
Initial dive allowed when launched from height of 11 feet	. . . . .	25 feet.
Distance allowed before regularity of depth is required	. . . . .	100 yards.

RUNNING TESTS

only required from the Howell as follows: When launched, from a running vessel with speed of 18 knots, in any direction, not to be deflected more than 15 yards in a range of 400, and without more error in depth than 24 inches. This to be maintained in a moderate sea.

The above table is constructed from the specifications, under the contracts of the Navy Department with the E. W. Bliss Company, manufacturers of the Whitehead torpedo, and the Hotchkiss Ordnance Company, makers of the Howell torpedo.

[1] Dimensions may be slightly different from these. Authority for Howell dimensions, "Automobile Torpedoes," by Lieutenant Drake, United States navy. For Whitehead, specifications and navy officers.

As the Whitehead has been the only automobile torpedo, purchasers have been obliged to take it on the terms of the makers, otherwise it would seem strange that this torpedo should have been accepted by the different governments without any *service* tests, for it is certain that the service record of a torpedo must be established by launching it from a vessel that is *moving* through the water, and often at a high speed.

In fact, the original contract with the United States Navy Department allows the Whitehead to make its acceptance tests from a submerged cage, which conditions could never under any possibility be duplicated in service, but, as has been stated before, the torpedo is now judged by such trials abroad.

It can be seen that service trials are required of the Howell.

During the past summer a number of trials have been made from the *Cushing* with the Whitehead when the speed of the boat was 13 or 14 knots. The torpedo was launched abeam. It was found that an allowance of 13 degrees was necessary to correct the deflection, or the change of direction caused by the bow being turned towards the stern on striking the water, and with this allowance in pointing the mean error at a distance of 400 yards was 43.6 yards. More careful trials from the *Stiletto* were made with the Howell, as records were obtained when launched in different directions, as ahead, on the bow, abeam, and on the quarter, and nets were used at 400 yards for determining the errors, which was not done with the Whitehead. These trials demonstrated that when the Howell was launched abeam, its deflection was 5 degrees, and with this allowance in pointing, the average error was 35.8 yards at a distance of 400 yards, the speed of the boat being from one to two knots greater than the speed of the *Cushing*.

The accuracy of depth or submersion is found satisfactory for the Howell by the Torpedo Board, but as no nets were out when the Whitehead was tried under service conditions, no comparison can be justly made. A comparison of the reports also shows that the Howell was more easily adjusted than the Whitehead, and that serious mishaps were much less likely to happen to the Howell than to the Whitehead.

The speed of the Whitehead was greater than the speed of the Howell, as the Whitehead can make 30 knots for 400 yards, or 26½ for 800, though it sometimes falls below those speeds. The speed of the Howell for 400 yards should be 22½ knots, and it very often exceeded that speed, sometimes reaching nearly 25 knots. There was also considerable reserve of power, since these trials were made when the fly-wheel was revolving at the rate of 9500 turns per minute, whereas it has been repeatedly launched when making 10,500 revolutions per minute.

As the Howell torpedo has a weight equal to only 60 per cent. of the Whitehead, and carries an explosive charge equal to 87 per cent. of that of the Whitehead, it is difficult to make a fair comparison between the speeds of the two torpedoes, but as a large torpedo has advantage over a small one as far as speed is concerned, and as larger proportional explosive charge means reduced proportional propelling power, it is almost certain that a Howell torpedo having the same weight and explosive charge of a Whitehead torpedo will equal it in speed and range. Indeed, this high speed probably exceeding that of the Whitehead is much more than a probability, since experiments abroad point very strongly to this end.

It would seem, then, that comparison of the records of beam-fire of the two torpedoes shows that the Howell is more efficient, its deflection being but 5 degrees, while that of the Standard torpedo, as it has been called, was 18 degrees, or nearly three times as much. It has been said that the steam turbine that spins up the fly-wheel of the Howell torpedo is not economical in the use of steam. This may be true, but the proprietors claim a horse-power for 36 pounds of steam per hour, which is quite good for non-condensing practice. Another turbine which was exhibited at Chicago claimed a horse-power for 20 pounds of steam per hour. Therefore, until proved wrong, we might assume 40 pounds per hour per horse-power as its consumption of steam.

As the fly-wheel only requires 500,000 foot-pounds of energy, or the work of a 30-horse-power engine for one minute from rest, it is hardly probable that the subtraction of this energy from the propelling force would appreciably affect the speed of any ordinary torpedo boat. In boats of small power the speed would be affected, but not materially, as the energy required for the torpedo is small compared with that available even in the smallest boats. Special attention should be given to the facts that, although the motor works at a *rate* inversely proportional to the time required to obtain the requisite revolutions of the fly-wheel, the *energy* required is always the *same*, irrespective of the time neces-

sary to spin up the wheel; and, secondly, as the mechanism will run for one hour in the air before coming to rest, it follows that an expenditure of 9000 foot-pounds of power per minute will keep the wheel running after it has been accelerated to the required speed, or at the rate of less than one-third of a horse-power.

Considering the two torpedoes, however, it is fair to say that, until the Whitehead has made a record from a torpedo boat at greater speed than that of the *Stiletto*, the reduction of her speed, due to the Howell motor, need not be considered in a comparison between the two systems.

The small weight of the Howell motor should be considered and compared with the engines and pumps necessary for compressing the air for the Whitehead, and however wasteful *it* may be it will never equal their want of economy, since it is understood that only five per cent. of the energy needed for compressing the air is utilized in the torpedo.—*Army and Navy Register.*

GUNPOWDER AND EXPLOSIVES.

POWDER FOR FIELD GUNS.—Bids for twenty thousand pounds of sphero-hexagonal powder for field guns for the United States army were recently received at the department. They were from the California Powder Company, and from the Duponts; the prices were respectively 25 and 27.62 cents per pound.

CORDITE: MANUFACTURE, EROSIVE ACTION, ETC.—"The interesting trial between Mr. Nobel and the British government having been the means of definitely settling the question of property in the invention of cordite (in favor of the government), it seems probable that makers of explosives will soon be wanted to tender for large quantities of what may now be called the service (British) smokeless powder. The manufacture is a very elegant one, and comparatively free from danger, mainly on account of the absence of dust. The production of nitro-glycerin is, indeed, a highly dangerous process, but freedom from the uncertainty involved in the presence of dust renders the manufacture safe if the proper precautions are rigidly observed. Cordite has now been definitely adopted for the magazine rifle, and for all the quick-firing guns, and charges have also been settled for some of the ordinary service breech-loaders, and notably for the splendid new naval 12-inch Longridge gun (wire-wound) which has just been produced in the Royal gun-factories. Although cordite has, up to this moment, been used only in the form of round cords varying in diameter from 0.0375 inch to 0.7 inch, steps are being taken to try other forms, such as square, hexagonal, oblong, and tubular. The latter form, which is produced exactly in the same way as lead pipe, was made as early as June, 1889, in small sizes, but is now being pressed out in large diameters. Cordite, being of a horny and non-porous nature, burns exclusively on the surface of the cords, and with such regularity that, when not fully consumed in the gun, it is ejected, burned down sometimes as thin as a thread, but yet of uniform thickness. It is obvious, therefore, that the rate of combustion depends upon the relation between the volume and the surface, and that the tubular form offers great facilities for varying this relation without making the cord inconveniently thin.

A good deal of misconception exists as to the wear of guns using the new explosive. As far as can be made out up to the present, the erosion due to cordite for the same ballistics is not greater than that produced by the old powders, but the wear is of a different kind. It is confined to a few calibres length from the chamber, and is more of the nature of a smooth washing away of the metal than of the deep grooving and scoring which black powder produces. Cordite, however, gives much higher ballistics, and on that account it is not to be expected that the wear will be any less, and as the bore is left perfectly clean, the abrasion caused by the friction of the bullet in rifles (small arms) is necessarily more severe (than in the old models); but still it is found (?) that the wear due to cleaning and periodical lapping out is more destructive under ser-

vice conditions than the actual firing.[1] One enormous advantage which may be claimed for cordite, besides the absence of smoke, is its indifference to wetting, and safety as regards explosion in magazines and in cartridges unconfined in the chambers of guns."—*Engineering* (London).

CORDITE FORMALLY ADOPTED IN BRITISH NAVY.—It is stated in the explanatory memorandum of the First Lord of the Admiralty, which accompanied the naval estimates for 1894–95, that cordite has been approved and definitely adopted for rapid-fire guns of 6-inch calibre and below, and for these calibres it is no longer considered experimental. For the heavier guns the explosive is still being experimented with.

GUN-COTTON: SENSITIVENESS WHEN WET.—Some experiments recently carried out in the United States in order to determine the largest percentage of water which gun-cotton may contain and yet be detonated with certainty, have resulted in the following conclusions: 1. A gun-cotton disk, containing as much as thirteen per cent. of water uniformly distributed through it, can be detonated by means of a service detonator; one containing eighteen per cent. may sometimes be so detonated. 2. A disk of gun-cotton containing as much as 12.89 per cent. of salt water, uniformly distributed through it, can be detonated by means of a service detonator; while a disk containing 15.22 per cent. of salt water may sometimes be so detonated.—*Arms and Explosives.*

GUNPOWDER, GUN-COTTON, NITRO-GLYCERIN: COMBUSTION TEMPERATURES.—Scattered throughout the literature of explosives may be found data for the combustion temperatures, or calorific intensities of gunpowder, nitro-glycerin, and gun-cotton, which vary between the following limits:

Black gunpowder . . .	3000° to 4000° C.
Gun-cotton	5000° to 6000° C.
Nitro-glycerin	7000° to 8000° C.

These data appear the more remarkable inasmuch as the lowest temperature cited is above the melting-points of most (all?) gun metals. Von Winch has recently called attention to an error into which many observers have fallen in respect of these data,—viz., the assumption that the specific heat of the products of combustion is independent of the temperature. He shows that this is not the case; and then, by means of a newly-developed expression for the specific heat, he obtains as the combustion of temperatures, or calorific intensities, of the above explosives the following values:

Black gunpowder	1874° C.
Gun-cotton	2516° C.
Nitro-glycerin	3005° C.

—*Arms and Explosives.*

FROZEN GELATIN COMPOUNDS.—The explosion of frozen nitro-glycerin is believed by Guttmann to be due to a sudden alteration in the molecular arrangement, such as Tyndall observed in the case of ice, and the consequent production of vibrations sufficiently high to cause a detonation. This is a striking illustration of the fact that an explosion is not always or necessarily a result of heat. Blasting gelatin and gelatin dynamite are extremely sensitive in a frozen state, and this is due to the collodion-cotton which such substances contain. In the soft gelatinous state every shock is annihilated, and the gelatins are indifferent in this state; but when the gelatin is frozen, and forms one hard, rigid mass,

[1] This statement is certainly incorrect. During the tests of the new (Lee-Metford) rifles it was found that they would stand ten thousand rounds with black powder satisfactorily, but that three thousand rounds of cordite caused serious erosion. Mr. Weir, M.P., recently asked the financial secretary in Parliament if anything had been done to prevent erosion of the barrel of the new rifle when using cartridges loaded with cordite and nickel-covered bullets. Mr. Woodall replied that "the matter was receiving careful attention, *but so far none of the alterations suggested had met the case.*" One of the proposed remedies was a special form of wad, but it proved to be merely mildly palliative. As regards the safety of unconfined cartridges (*i.e.*, cartridges in bags and not in metal cases) in the chambers of guns, it seems to be admitted that cordite will not stand a temperature greatly in excess of 125° F. If that is so, then the rapid-fire features of the 8-inch and longer guns is of little value,—if they are to use cordite,—as they will quickly get too hot for safe loading.—EDITOR OF NOTES.

a blow will be readily communicated throughout the whole mass, and the collodion-cotton will be the first ingredient to explode.—*Arms and Explosives.*

FULGURITE: EXPERIMENTS WITH.—This explosive, the invention or discovery of the eminent chemist M. Pictet, of Geneva, is attracting a good deal of attention, and, if the claims for it are substantiated, it is a very wonderful substance. Three series of experiments have taken place at Thun, Friburg, and Lavaux. A copper cartridge charged with fulgurite No. 3,—for there are three varities, differing in the proportions of their constituents,—placed upon the ground and fired by electricity, was driven deeply into the earth by the force of the explosion. There was no smoke, and, what was more remarkable, the body of the cartridge was cold, as the experts testified. The No. 3 fulgurite was also experimented with at Friburg for mining purposes, and its effects were described as slow and progressive, while Nos. 1 and 2 gave results that were *brisants*. The wooden blocks which supported the cartridges charged with these were pulverized at the top, and the cartridges themselves were blown into atoms, but here again there was no heating. The same explosives were used with powerful effect for rock-blasting. A singular feature is that detonation can be produced by no ordinary means, and at Friburg a powerful accumulator was used. The ballistic trials took place at Lavaux, No. 3 fulgurite being substituted for white, smokeless powder in the cartridges of the new Swiss rifle. Many experiments were made, with very remarkable results. While the initial velocity with the ordinary Swiss smokeless powder is 560 metres, fulgurite gave 668 metres, or 2202 feet. There was neither smoke nor heating nor fouling of the rifle. A singular phenomenon was also reported,—whenever the velocity exceeded 600 metres the ball appeared to be visible to the naked eye, a circumstance which M. Pictet attributes to the compression of the air, whereby oblique rays of light are refracted. A diffused light is said to be thus caused, giving the appearance of a white cup traversing the air. M. Pictet states that his explosive must be so constituted as to give a minimum pressure. For velocities below 450 metres it possesses this quality, the pressure being less than 500 atmospheres (3¼ tons per square inch); but with higher velocities the pressure is too great for the satisfaction of the inventor. He hopes in a further series of trials to gain a maximum velocity with a minimum pressure. The above is derived from a comparison of various foreign periodicals, all in substantial agreement, but chiefly from the *Army and Navy Gazette.*

ARMOR.

TEST OF 6-INCH, NICKEL-STEEL, HARVEYIZED PLATE.—A successful test of Harveyized armor took place at Indian Head in April. It was the first service Harveyized plate turned out by the Carnegie Steel Company, and represented 300 tons of completed armor for the 8-inch barbettes of the *Indiana* and *Massachusetts*. The plate was an arc of a circle, 6 inches thick, 22 feet in length, and 5 feet 3 inches wide. The first two shots constituted the acceptance test and the other two were experimental. The velocities of the four shots were 1472, 1650, 2000, and 2125 feet per second respectively. The gun used was a 6-inch breech-loading rifle. The first three shots penetrated the plate but a short distance, broke up, and left their points in the plate. The fourth shot, with a velocity of 2125 feet per second, perforated the plate, broke up, and lodged in the first timber of the backing. No cracks developed in the plate, notwithstanding that two shots struck within fifteen inches of each other, the walls of the holes being only 7 inches apart. This plate shows the highest resistance to penetration of any plate of its thickness which has been tested up to the present time; and this resistance is further combined with a wonderful resistance to cracking.

TEST OF 8-INCH, NICKEL-STEEL, HARVEYIZED PLATE.—A test of a 8-inch, nickel-steel, Harveyized plate, representing a group of plates for the side armor of the *Brooklyn*, and furnished by the

Carnegie Company, took place at Indian Head, April 10. Three shots were fired from a 4-inch, rapid-fire gun,—two for acceptance test and one for experimental purposes. The projectile was of the forged-steel armor-piercing type. The first shot was fired with a velocity of 1200 f. s. It simply indented the plate slightly. The velocity of the second shot was 1367 f. s. The result was the same as with the first. The plate was then accepted. The experimental shot struck the plate with a velocity of 1800 f. s. The projectile was smashed, but failed to penetrate the plate. The surface was broken, however, and a piece of the back of the plate forced out. In the opinion of Captain Sampson, chief of the Bureau of Ordnance, United State navy, who was present, the plate was as good as the remarkable 6-inch plate tested a few days before (which test is given above.)

MISCELLANEOUS NOTES.

COLLAPSIBLE SPHERE SIGNALING APPARATUS.—Further experiments are being made in England with the signaling apparatus invented by Prince Louis, of Battenburg and Captain Percy Scott. This apparatus consists of a collapsible frame surrounding the mast near or at the mast-head, which can be expanded to form a ball or sphere, and is worked by an operator on deck. One or more balls can be used. It is believed that the signals so made can be seen at a distance of several miles, while flags are often difficult to read at one. Many improvements have been introduced since the apparatus was first tried on board the *Royal Sovereign*, and these will all tend to simplification and speed in working. The new experiments will be made in the North Sea and will be secret.

CARRIER PIGEONS IN THE BRITISH NAVY.—Some attention is being paid to the use of carrier pigeons in the British navy. Some trials have been made by releasing pigeons from outward bound Indian troop-ships. And during the recent gunnery trials of the *Hero* further experiments were made. The trials were all sufficiently satisfactory.

TEST OF COLOMES LEAK-STOPPERS.—About the middle of April the Franco-American Cellulose Company, of Philadelphia, conducted some successful experiments at their works in presence of a board appointed by the Navy Department, consisting of Superintending Naval-Constructor J. F. Hanscom, U.S.N., and Naval-Constructor W. L. Capps, U.S.N. There were also present a number of invited guests. The experiments proved entirely successful. The first experiment was made on a ragged hole, 2½ inches in diameter, with leak-stopper No. 1, and the hole was entirely stopped in 20 seconds. Next, an irregular hole, 10 inches in diameter, was obturated in one minute with leak-stopper No. 3. The third experiment was made on an irregular hole, 21 inches long, averaging 5 inches wide; and this was closed by slipping in side by side three leak-stoppers No. 2, time 1½ minutes. The pressure of water in the experimental tanks was kept at 12 feet.

ALUMINUM HAWSERS FOR THE UNITED STATES NAVY.—It is possible that in future wire hawsers for use in the navy will be made of aluminum. The Bureau of Equipment is now testing aluminum wire for use in hawsers. Strength for strength it is said that the aluminum hawsers will be one-third higher than wire hawsers. Another and very important advantage is the incorrodibility of aluminum.

L. S. VAN DUZER,
Lieutenant U.S.N.

PHILIP ANDREWS,
Ensign U.S.N.

SERVICE SALAD.

The Late Comte de Paris.

(From the Illustrated London News, September 29, 1894.)

When the news of the death of the Prince Imperial reached Paris, the Duc de Broglie exclaimed, "The Republic has the luck of it all round; the Prince Imperial is dead and the Comte de Paris is alive" (*La République a toutes les chances; le Prince Impérial est mort et le Comte de Paris vit*). Not the most persistent detractors of M. de Broglie have ever accused him of a lack of sympathy with the Orleanist cause; the exclamation, then, was tantamount to an indictment of the deceased prince's attitude as a pretender to the throne occupied by his grandfather. Even at this moment, when pity at the sad and cruel end of a kindly, brave, and upright prince swamps every other feeling, it would be idle to deny the justice of M. de Broglie's epigrammatically conveyed, but none the less sincerely felt, disapproval of a policy which from its first inception to its latest development erred in "letting 'I dare not' wait upon 'I would.'"

It must not be inferred, though, that the physical courage for an attempt to overthrow the Third Republic by force of arms was wanting either in the head of the house of Orleans or in any of its members,—an attempt to overthrow the Second Empire was probably never seriously debated by them;.I repeat, it was not the physical courage that was wanting. When at a memorable banquet at the Mansion House in the forties, Sir Robert Peel described the offspring of Louis Philippe as "a family, all the men of which are brave and all the women chaste," he uttered no mere empty after-dinner compliment, and one may safely aver that the praise would hold as good with regard to the second generation as it did with regard to the first. No, it was not the physical courage that was wanting in the Comte de Paris or in his kinsmen; it was, first of all, an inherited fear of comparative poverty; secondly, an inherited repugnance to shed the blood of Frenchmen in a fratricidal strife. For there is no doubt that the constant fear of relapsing into his former poverty was the besetting sin of Louis Philippe; there is equally no doubt that a miscarried attempt of the Comte de Paris to recover his grandsire's throne would have been followed by the confiscation of the whole of the property of the Orléans family in France. And although the French are unquestionably the most rapacious nation on the face of the civilized globe, they refuse to sanction "a like carefulness" in their rulers; be they named kings or presidents. Nine-tenths of the satires leveled at Thiers and Grévy aimed in that direction; and though Louis Philippe has been dead these fifty years, gossips still relate with malicious glee his answer to the request of Harel, the then lessee of the Odéon, for a loan of thirty thousand francs,—"My dear Monsieur Harel, I was just going to ask you for a similar sum." In the opinion of most Englishmen, Louis Philippe's greatest claim to the respect and reverence of posterity is that of having prevented, as far as he was able, the shedding of blood during the revolution that cost him his crown. But such abnegation of self is, I fear, scarcely understood even by the most educated of Frenchmen. One day a French officer was decribing the battle of Mentana to Napoleon III. "I made a prisoner, sire,

who turned out to be a Frenchman and an old acquaintance from the Boulevards. He was furious against Garibaldi, because the latter had imposed upon him the necessity of firing on his own countrymen in a strange land. 'I am not an émigré,' said the prisoner; 'I would not have gone to Coblenz; I am a Frenchman from the crown of my head to the sole of my foot. If it came to fighting Frenchmen in the streets of Paris, I would not mind it. I should have no scruple in firing on the Imperial Guards or on the rabble, for that would be civil war.' That's what he said, sire," wound up the emperor's interlocutor. The emperor nodded his head, and with his wonderful sphinx-like smile, replied, "Your prisoner was right; it makes all the difference."

If the sons and grandsons of Louis Philippe had been able to evolve such subtle distinctions from their own conscience, or act upon them, if suggested by others, the prince, whose terrible mental suffering during his last days, as well as his slow and tragic death, must have aroused the compassion of every one, would have ended his life as king of France, or if not that, have descended to his grave as a pretender in deed, as well as in name. But, rightly or wrongly, he refused to be instrumental in the shedding of the blood of his own countrymen in civil war; his elders had given the example to that effect, and their nephew had learned the lesson early. Before he was ten he had seen the horrors of such civil war too closely to inflict them willingly. Five days before the crash came that made him and his nearest and dearest exiles for more than twenty years, his mother had been compelled to afford him an insight into the terrible meaning of the word "revolution." "You are not able to understand as yet; you can only pray to God to avert the evil that threatens France," she said on the morning of February 24, 1848, as she entered the room where he was waiting for his tutor to give him his lessons. The lad understood probably, for he was intelligent, but if he failed to grasp the situation then, he could not have failed to do so on the 28th, when he was taken on foot through a surging crowd across the Place de la Concorde to the Palais Bourbon, where the Duchesse d'Orléans intended to make a last appeal in favor of her fatherless son. The subsequent scenes of violence, during which his own life as well as that of his brother and mother hung by a slender thread, were never effaced from his memory, and doubtlessly influenced the whole of his after-life. They taught him patience and forbearance, though, odd to relate, their effect was different upon his younger brother, the Duc de Chartres. We have the letters of the Duchesse d'Orléans herself in support of this.

The next ten years were spent in Germany and in England,—in that smiling Surrey home which became almost as dear to him and his as their native one, and then his mother died: the mother who shortly before her death wrote that "there was no need of her protection; that, in fact, he protected her." The serious but by no means priggish lad had grown into a serious, studious man before his time, as it were, and his travels only tended to increase the sterling traits in his character, but even in those days it would not have been difficult to foretell that the adventurous spirit of his father and of two of his uncles, the Prince de Joinville and the Duc d'Aumale, would form no part of his mental and moral *apanage*. That spirit would be his younger brother's lot. Again I wish to point out that there was no lack of courage, but that courage lacked the dare-devil stamp without which no pretender can hope to succeed, and least of all in France. Contemporary France is like the Brynhild of the "Nibelungen,"—she must be roughly handled before she will yield her love, and, above all, her respect.

In 1861 the two sons of the Duc d'Orléans, in company with their uncle Joinville, embarked for the United States, where the war of Secession was at its height. I have an idea that the journey was undertaken for the express purpose of affording the Comte de Paris an opportunity of learning the art of warfare, albeit that this purpose was scarcely ever avowed. Less fortunate in that respect than the Duc de Chartres, who received his military training at the Military

Neptune's Lofty Vigil.

The god of the deep is sleepless. From his lofty column he scans the wonders of the Fair. The inland sea, a thousand miles away from his domain, unfolds its myriad beauties to his view. Upon the shore, where dash the ocean's waves, sublimer spectacle never met his gaze than here his eyes encounter.

Coadjutor of Columbus, Neptune figures fittingly at the World's Fair. The column bearing his figure is appropriately symbolical of his limitless empire.

The highest award was conferred on

Dr. Price's Baking Powder

at the Chicago Exposition. Superior leavening strength, perfect purity and wholesomeness were the attributes which enabled it to distance all competitors. The victory at Chicago has since been confirmed by the highest award and gold medal at the California Midwinter Fair. The midland triumph is grandly crowned on the coast.

Mellin's Food Children

everywhere are the best advertisement of Mellin's Food: with their sound bodies, straight limbs, bright eyes, plump cheeks and fresh, radiant faces, they are the highest types of happy, healthy childhood, and the best evidence that Mellin's Food fulfills every requisite of a food for Infants.

Our book for the instruction of mothers sent free on application.

DOLIBER-GOODALE CO.,
BOSTON, MASS.

Academy of Piedmont, and who fought in the Franco-Austrian War of 1859, the Comte de Paris had had no practical experience of soldiering. Victor Emmanuel could not have extended the same favor to the eldest grandson of Louis Philippe without placing himself in a false position towards Napoleon III. Be this as it may, the young princes worthily upheld the honor of their name with the Army of the Potomac, under McClellan. But for the disastrous expedition of Napoleon III. against Mexico, and the rupture of the Soledad Convention, they would probably have remained till the end; as it was, they returned to Europe after eight or nine months' campaigning, and the literary first-fruit of the Comte de Paris's experiences was not, as might have been expected, an article on soldering, but a deeply pondered essay on "The Cotton Famine" in Lancashire, which appeared in the *Revue des Deux Mondes*, though not signed by its author. That already marked the tendency of the young Prince's mind.

In 1864 the comte married his cousin, Marie Isabelle de Montpensier, in that very Catholic chapel at Kingston-on-Thames, where, five-and-twenty years later, I was present at the celebration of his silver wedding. Much had happened during that quarter of a century. Two years after the birth of his son, the present Duc d'Orléans (February, 1869), it seemed that a turn in the tide had come. Sedan had been lost, Paris had surrendered, France was thoroughly disorganized and as much in want of a savior as in 1851, but Louis Philippe d'Orléans was not a Louis Napoleon. He made the mistake of trusting too implicitly to that second-rate Talleyrand, —Adolphe Thiers,—whose incarceration was Louis Napoleon's first care in the nick of time. The mistake was repeated nineteen years later with that poor copy of that poor original,—Changarnier. I am alluding to Boulanger. When the history of the Third Republic comes to be written, the historians will say that the Comte de Paris failed through the force of circumstances. "The force of circumstances" is frequently but a euphemism for "the weakness of men." Regretted, and deservedly so, by many friends, ardent and sincere in his cause, the deceased prince will only leave a void as a friend, as a man who led a thoroughly blameless, exemplary life; as a pretender he will leave no void, for his stanchest adherents, and I could name three or four among the foremost, had long abandoned all hope of arousing him to action. Rivarol, the satirist of the first Revolution, in consequence of Louis the Sixteenth's want of energy, made a nobleman say, "You hesitate to be my king; I decline to be your subject any longer." If the Bochers, the Harcourts, the Haussonvilles, the Beauvoirs were not as outspoken, it was simply from an almost paternal, fraternal, and filial feeling for a prince whose private virtues were beyond dispute, but of whom the sincerest friends of France, whether foreign or native, nay, France herself, might have said what Goethe said of his mistress, "She is perfect; she only fails therein that she loves me too well."

ALBERT D. VANDAM.

A French View of the German Emperor.

M. JULES SIMON, the well-known Frenchman of letters, and one of the most important members of the Peace Society, gives in the August *Revue de Paris* a sympathetic sketch of William II. as seen by him during his late visit to Berlin. What struck the old Frenchman most was the Emperor's extreme frankness and honesty of manner.

Of the Imperial Palace and of a reception given by the Emperor and Empress he gives an interesting account. "The Emperor stopped and said a few words to me, as did the Empress, a rare favor, which made me at once acquire a certain importance to those round me; then a message was sent to ask me to walk alone behind the Emperor and to sit at his right hand." But far more interesting than this banquet were the conversations held by M. Simon with William II. at one of the latter's small private parties, which are held once a week, and when only intimate friends are received. On this occasion M. Simon was again asked to sit by the Emperor. "I never saw him excepting in uniform.

On the occasion of which I am writing he wore a white Hussar costume, and with his tall slight figure looked like a young officer. . . . His countenance is agreeable, his manner affable and kindly; and his nut-brown hair seems sometimes shot with gold." The Kaiser speaks French, it seems, without the slightest accent and with extraordinary ease, and few, according to the writer of this article, know so thoroughly both ancient and modern French literature. He confided to M. Simon that his favorite novelist was Georges Ohnet, but he has a violent antipathy to Zola. "I know that he has great qualities," said the Emperor, "but it is not to them that he owes his popularity; it is to the moral villainies and dirt with which he poisons his stories. That France should like such a writer gives foreigners the right to judge her severely;" but, observes M. Simon, significantly, a few days later Berlin was flooded with the great realist's new work.

William II. assured his French visitor that he was a regular family man, and that his happiest evenings were spent in dining quietly alone with his wife, and reading aloud to her a chapter of some novel before going to sleep.

M. Simon could not "draw" his host on the question of war, excepting in the most abstract fashion, such as observing incidentally that the man who tried to provoke a war between two great nations would be both a madman and a criminal.

On social questions the Emperor seems to have very clear and decided views, and to be possessed with a very real fear of Socialism. He would like to limit the working hours of women, especially those who happen to be in what is termed an interesting condition; and when the Labor Congress passed a resolution recommending that such a course be taken, he specially congratulated M. Simon on the part which the latter had taken in the discussion.

M. Jules Simon dined with Bismarck the evening of the day on which the Iron Chancellor sent in his resignation to his imperial master, and during the long conversation which they had after dinner, the Prince told his French guest that he intended, when in retirement, to write his memoirs. M. Simon has done both William II. and himself good service in publishing this interesting account of the Emperor of Germany, for his words bear weight, and he is known to have been at no time of his long life a courtier.

Throat and Lungs.

Under the above head come such angerous forms of illness as Bronchitis nd Consumption. Coughs, Colds, Sore hroat and Weak Lungs are milder rms of the ailments of Throat and ungs, but they come in the same tegory.

Scott's Emulsion

Cod-liver Oil, with Hypophosphites, ssesses soothing and curative proper- es not found in any other remedy for hroat and Lung complaints. It strengths the system, supplies new lung tissue, othes the throat, relieves inflammaon and effects most remarkable cures. has stood the test of twenty years d is more popular than ever, because cures.

Remember that Scott's Emulsion contains no harmful drugs. It is not a secret compound. It is sweet to the taste, easy on the most delicate stomach, and much more effective than plain Oil. The only genuine Scott's Emulsion bears our trademark on *salmon-colored wrapper*. Refuse substitutes!

Send for pamphlet on Scott's Emulsion. FREE.

ade-Mark.

TT & BOWNE, N. Y. **All Druggists.** **50 cents and $1.**

SAFEST, FASTEST, AND FINEST TRAINS IN AMERICA,

RUN VIA

Baltimore and Ohio Railroad

ALL TRAINS RUN VIA WASHINGTON

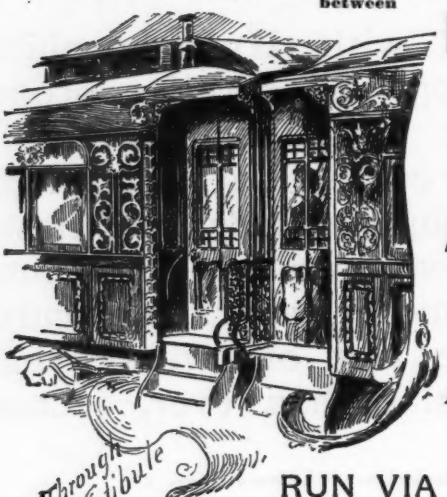
— BETWEEN —

NEW YORK, PHILADELPHIA, BALTIMORE, AND WASHINGTON.

ALL TRAINS VESTIBULED FROM END TO END,
And protected by Pullman's Anti-Telescoping Appliance, including Baggage Cars, Day Coaches, Parlor Cars, and Sleepers.
ALL CARS HEATED BY STEAM, AND LIGHTED BY PINTSCH GAS.

THE BALTIMORE AND OHIO RAILROAD

Maintains a Complete Service of Vestibuled Express Trains between



New York, Cincinnati, St. Louis, and Chicago,

EQUIPPED WITH

PULLMAN

Palace Sleeping Cars

Running Through without Change.

ALL B. AND O. TRAINS BETWEEN THE EAST AND WEST

RUN VIA WASHINGTON.

PRINCIPAL OFFICES:

Corner Wood Street and Fifth Avenue, Pittsburg, Pa.

105 N. Broadway, St. Louis, Mo.
415 Broadway, New York.
193 Clark Street, Chicago, Ill.
211 Washington Street, Boston, Mass.
N. E. Cor. Ninth and Chestnut Sts., Philadelphia, Pa.
Cor. Baltimore and Calvert Streets, Baltimore, Md.
1351 Pennsylvania Avenue, Washington, D. C.
Cor. Fourth and Vine Streets, Cincinnati, O.

R. B. CAMPBELL, *General Manager.*

CHAS. O. SCULL, *General Passenger Agent.*

BALTIMORE, MD.

MILITARY ORDER OF THE LOYAL LEGION OF THE UNITED STATES.

Companions of the Loyal Legion are invited to contribute to this department. News of the Commanderies is always welcome, but suggestions likely to inure to the benefit of the whole organization are of higher value, and therefore particularly desired. The pages of the Loyal Legion Department of the "United Service" are always at the service of members of the Order desiring to discuss matters of general interest to their comrades of the Military Order of the Loyal Legion.

Pennsylvania Commandery.

Stated meeting held October 10, 1894.

New York Commandery.

Stated meeting held October 10, 1894.

To THE FIRST CLASS.—Civil Engineer **Peter C. Asserson**, U.S.N.; Captain **Alexander S. Clarke**, late U.S.A.; Major **Augustus P. Clarke**, U.S.V.; Captain **William Conway**, U.S.A. (retired); First-Lieutenant **George B. Culver**, U.S.V.; Chaplain **Alfred H. Dashiell**, U.S.V.; Lieutenant-Colonel **Samuel G. Pierce**, U.S.V.; Brevet Brigadier-General **Theophilus F. Rodenbough**, U.S.A. (retired); First-Lieutenant **E. Nott Schermerhorn**, U.S.V.; Captain **William Seton**, U.S.V.

To THE FIRST CLASS (by inheritance).—**Frank J. Harris, James A. Hawes, Gustavus C. Sniper.**

Illinois Commandery.

Stated meeting held October 11, 1894.

To THE FIRST CLASS.—Captain **Geo. R. Richardson**, U.S.V.

To THE FIRST CLASS (by inheritance). **Loren Kent.**

To THE SECOND CLASS.—**Charles C. Hydes.**

Minnesota Commandery.

Stated meeting held September 11, 1894.

To THE FIRST CLASS.—Lieutenant-Colonel **Warren Granger**, U.S.V.; Captain **Thomas B. Hizar**, U.S.V.

Stated meeting held October 9, 1894.

To THE FIRST CLASS.—Major **James M. Bowles**, U.S.V.; Captain **William Bird**, U.S.V.

Missouri Commandery.

Stated meeting held October 6, 1894.

To THE FIRST CLASS.—Captain **Thos. H. Macklind**, U.S.V.; Captain **Frederick Gottschalk**, U.S.V.

Iowa Commandery.

Stated meeting held October 9, 1894.

To THE FIRST CLASS.—Lieutenant **Alexander McCrackin**, U.S.N.; Lieutenant **Erasmus W. Patlock**, U.S.V.

To THE SECOND CLASS.—**Erastus Burrows Soper, Jr.**

Colorado Commandery.

Stated meeting held October 2, 1894.

To THE FIRST CLASS.—Lieutenant-Colonel **Wilbert B. Peters**, U.S.V.; Lieutenant **George M. Shute**, U.S.V.; Captain **James L. Hodges**, U.S.V.; Lieutenant **Wm. H. Hassan**, U.S.V.; Captain **George Bucklin**, U.S.V.

To THE FIRST CLASS (by inheritance).—**Frank Orris Blake.**

NECROLOGY.

Pennsylvania Commandery.

Major **Chas. M. Conyngham**, U.S.V., September 6, 1894, at Wilkesbarre, Pa.; Captain **Philippe d'Orléans** (Comte de Paris), U.S.V., September 8, 1894, at Buckingham, England; Rear-Admiral

Edward Y. McCauley, U.S.N., September 14, 1894, at Jamestown, Pa.; Lieutenant-Colonel **W. F. Speer**, U.S.V., September 15, 1894, at Pittsburg, Pa.; Hon. **Andrew G. Curtin**, October 7, 1894, at Bellefonte, Pa.; Chief-Engineer **Henry D. McEwan**, U.S.N., October 18, 1894, at Washington, D. C.

New York Commandery.

Major-General **Henry E. Davies**, U.S.V., September 6, 1894, at Middleboro, Mass.; Lieutenant **James Chatfield**, U.S.V., September 19, 1894, at Mount Vernon, N. Y.; Brevet Major **William E. Donnell**, U.S.V., September 19, 1894, at New York City.

Illinois Commandery.

Lieutenant **Henry P. Ayres**, U.S.V., September 6, 1894, at White Bear Lake, Minn.; Captain **Thomas Wallace**, U.S.V., September 2, 1894, at Evanston, Ill.

California Commandery.

Colonel **George Stoneman**, U.S.A., September 5, 1894, at Buffalo, N. Y.; Brevet Brigadier-General **Charles R. Thompson**, October 3, 1894, Agnews, Cal.

Wisconsin Commandery.

Brevet Captain and Assistant-Surgeon **Richard B. Brown**, U.S.V., October 11, 1894, at Milwaukee, Wis.